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ABSTRACT

This compilation of three papers investigates theoretical and practical facets of career development, focusing on cognitive theory and decision-making theory and their roles in the formation of computerized career development systems. In the first paper ("Cognitive-Behavioral Theory and Its Application to Career Development"), Gerald Stone describes three cognitive-behavioral theories (social learning, cognitive restructuring, and cognitive development). He highlights the importance of individual constructs in explaining human behavior and explores applications of the theories to career issues. The second paper ("Career Decision Making"), by David Jepsen, reviews career decision-making models, focusing on the processes that people use to organize information about themselves and their surroundings in order to make vocational decisions. He also describes a number of decision-making aids, such as decision trees and simulations, and concludes by summarizing implications of the models for theory and research. Roger Myers, in the third paper ("Computerized Approaches to Facilitating Career Development"), depicts the state of the art of computerized approaches to career development. Distinguishing between computer-based information and guidance systems, he shows how the latter use both cognitive theory and decision-making theory to contribute to the process of career choice. The compilation concludes with an extensive list of references. (SK)

Information Series No. 262

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USING INFORMATION IN CAREER DEVELOPMENT:

FROM COGNITIONS TO COMPUTERS

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FOREWORD

The Educational Resources Information Center Clearinghouse on Adult, Career, and Vocational Education (ERIC/ACVE) is one of sixteen clearinghouses in a nationwide information system that is funded by the National Institute of Education. One of the functions of the Clearinghouse is to interpret the literature that is entered into the ERIC database. This paper should be of particular interest to researchers and graduate students in the area of career development as well as vocational guidance counselors.

The profession is indebted to Lenore W. Harmon, the University of Illinois; Gerald L. Stone, the University of Iowa; David A. Jepsen, the University of Iowa; and Roger A. Myers, Teachers College, Columbia University, for their scholarship in the preparation of this paper.

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Recognition is also due to Susan D. Phillips, State University of New York at Albany; to Edwin A. Whitfield, San Diego County Schools; and to Paul Campbell and Louise Vetter, the National Center for Research in Vocational Education, for their critical review of the manuscript prior to its final

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EXECUTIVE SUMMARY

This compilation of three papers investigates theoretical and practical facets of career development, focusing on cognitive theory and decision-making theory and their role in the formation of computerized career development systems. In the first paper, Gerald Stone describes three cognitive-behavioral theories (social learning, cognitive restructuring, and cognitive development). He highlights the importance of individual constructs in explaining human behavior and explores applications of the theories to career issues. The second paper, by David Jepsen, reviews career decision-making models, focusing on the processes that people use to organize information about themselves and their surroundings in order to make vocational decisions. He also describes a number of decision-making aids, such as decision trees and simulations, and concludes by summarizing implications of the models for theory and research. Roger Myers, in the third paper, depicts the state of the art of computerized approaches to career development. Distinguishing between computer-based information and guidance systems, he shows how the latter use both cognitive theory and decision-making theory to contribute to the process of career choice. The compilation concludes with an extensive list of references.

Information on theory and practice in career development may be found in the ERIC system under the following descriptors and identifiers: *Career Development; Epistemology; Behavior Theories; *Decision Making; *Career Counseling; Information Utilization; Occupational Information; *Cognitive Processes; Socialization; Cognitive Development; Cognitive Restructuring; *Career Choice; Computer Oriented Programs; *Computer Assisted Guidance. Asterisks denote terms having particular relevance.

INTRODUCTION

Lenore W. Harmon
University of Illinois

Ideally, career development is the process whereby an individual develops increasingly accurate self-perceptions of the opportunities offered by the environment, and perceptions of the relationship between self and opportunities. During the process, the individual is required to develop and utilize various types of information. Basically, this compilation of papers is about collecting and using information in career development.

The first paper, by Gerald Stone, explores cognitive theory and its relationship to career development. His basic point is that individuals construct their own realities; they are not passive recipients of input from the environment. Thus, an individual's constructs of self and of aspects of the environment are developed out of an interaction between new information and prior learnings that are unique to the individual. He discusses aspects of social learning theory, cognitive developmentalism, and cognitive restructuring that have implications for career development, and raises some interesting questions arising out of these applications.

The second paper, by David Jepsen, focuses on decision making in career development. He summarizes career decision-making models and shows the importance of information as well as the importance of the process in which it is used. His paper contains a very useful section on career decision-making aids.

The final paper, by Roger Myers, deals with the use of computers in career development. He makes an interesting distinction between systems designed to provide information and those designed to provide guidance. In the first type, the system is not designed to assess or interact with the individual's unique reaction to the information it provides; that is, cognitive theories do not provide the assumptions for this type of computerized system. Myers does not fault such systems; he merely concludes that they capitalize on what computers do well. On the other hand, systems designed to provide guidance make use of both cognitive theory and decision-making theory. They utilize both the development of personally relevant information about the self and aspects of the environment and the use of this information in decision making.

One of the challenges of conceptualizing this set of papers was to attempt to achieve the type of integration between theory and practice that is often called for but seldom realized. Each of the papers stands alone, and within itself has both theoretical material and practice applications. However, the amount of theoretical and practical material varies among the papers, by design, with Stone's paper being the most theoretical and Myers' paper being

the most practical. It is hoped that the reader will also see these three papers as an interrelated set, with cognitive theory forming part of the basis for decision-making theory and both forming part of the basis for computerized career development systems.

Taken together, these three papers may cause the reader, whether researcher or practitioner, to formulate new questions about the use of information in career development. For instance, Jepsen's musings about how tolerance for ambiguity and flexibility in career decision making can be taught led me to wonder which of the computer-based guidance systems discussed by Myers attend to teaching flexibility and tolerance for ambiguity and whether they are effective. Another example of this type of question from my own reading of these papers deals with the relationship of cognitive-developmental concepts to planning career decision aids and computer-based guidance systems. Surely, the developmental stage of the individual using a given decision-making strategy or computerized guidance program must be related to the effectiveness of the intervention for that individual. There is also some concern as to how the needs of the poor, minority group members, and women are addressed by the interventions based on research that did not include them.

If the reader is stimulated by these papers to ask questions that will improve the quality of career development interventions or to expand the knowledge base on which they rest, the authors and the editor will be most pleased.

COGNITIVE-BEHAVIORAL THEORY AND ITS APPLICATION TO CAREER DEVELOPMENT

Gerald L. Stone
University of Iowa

A popular development in the social sciences has been a return to interest in cognition. Perception, learning, motivation, personality, and psychotherapy have taken on new meaning and interest in psychology as a consequence of a cognitive renaissance (Stone 1980). An example from the scientific literature on memory (Alba and Hasher 1983) highlights a major theme of cognitive theory. Early memory theorists, relying on the views of positivism and the empirical traditions of Newton and Locke, suggested that memory representations consist of accurate, stable, and durable traces of external reality independent of cognitive activities. Bartlett (1932), however, in accounting for the distorted recall of complex stories, suggested a greater degree of mind involvement and rejected the notion that memory is independent of cognitive activities. Modern descendants of Bartlett, called schema theorists, such as Minsky (frame theory) and Schank and Abelson (script theory), propose that what is encoded and stored in memory is heavily determined by general knowledge structures (e.g., schemas, scripts, or frames) about a particular event. As a result, these knowledge structures actively shape our representation of experience.

From this example, a major theme in cognitive psychology has to do with constructivism, namely, the idea that external events are not merely reflected in but are changed by internal processes. Although there is a range of positions within constructivism--from the belief that human reality is created to the more modest assertion that this reality is influenced by our cognitive activities--all the positions posit involvement of the mind.

The emergence of the constructivist position was not restricted to experimental psychology but was facilitated by the introduction and development of computer technology, cognitive ability testing, and humanism. Each of these developments focused on internal functioning--information processors, traits, or values--and contributed to the emergence of such constructive-based psychologies as information processing and personality based on trait and humanistic perspectives.

In the applied aspects of psychology, including the areas of personality, development, clinical, and counseling, constructivism was joined with learning and developmental theories to form major cognitive-behavioral perspectives. Three of these perspectives will be emphasized in this section. They are social learning, cognitive restructuring, and cognitive developmentalism. The social learning and cognitive restructuring perspectives reflect a convergence of behavioral methodology and a constructive approach to personality. The

other perspective, cognitive developmentalism, combines constructivism with a stage approach to development.

In the following subsections, each of these perspectives will be discussed along with applications to career development.

Social Learning

Theory

Although many historical origins could be listed, including the use of imitative (mimesis) methods in ancient Greek and Roman pedagogy (Clark 1957) and the works of the French sociologist Tarde (1903) and psychologically oriented social scientists like Baldwin (1906) and Miller and Dollard (1941), it was Bandura's classic text Principles of Behavior Modification (1969) that presented the most comprehensive and systematic account of social learning theory.

Fundamental to social learning is the distinction between vicarious acquisition (observational learning) and imitative performance. Acquisition occurs through observation and the cognitive processing of observed phenomena through which events can be meaningfully retained and interpreted. Performance, on the other hand, is a function of incentive conditions.

In addressing the distinction between acquisition and performance, Bandura has combined elements of information processing theory with elements of reinforcement theory. He treats acquisition in terms of cognitive components: attention and retention processes. The cognitive components based on prior experience influence, to a great degree, what is attended to and perceived. In addition, input must be coded (verbal and/or imaginal representations), organized into a meaningful framework, and symbolically rehearsed if material is to be effectively retained.

The motor reproduction processes (motoric skill capabilities) and motivational processes (reinforcement conditions) determine the translation of learning into action.

Social learning theorists discuss learning as a function of three interdependent and interacting sources of influence: antecedents, cognitive mediators, and consequences. Antecedents refer to the impact of events that precede a person's behavioral change. Social learning psychologists believe that the most important antecedent events are social, such as a person influencing an observer. Thus modeling, live or symbolic, is a widely used social learning method.

A second source of influence concerns cognitive mediation. The importance of cognitive activity is particularly evident during transfer after modeling. During transfer, a vicariously learned response is represented in a new context with, perhaps, added personal knowledge components. Such cognitive representations serve to guide future performance. Recently, Bandura (1977)

has suggested expectations about personal capabilities, termed self-efficacy expectations, as a major cognitive mediator in behavior change.

A final source of influence has to do with reinforcement. Social learning psychologists recognize the importance of the incentive function of reinforcement but stress the informative role of reinforcement, such that a tangible reinforcer like candy is both an incentive to respond as well as an informative cue indicating success.

In sum, these three types of influence--antecedent events, cognitive representations, and reinforcement consequences--have been integrated as reciprocal influences in social learning theory. Social learning theory has brought together cognitive and reinforcement theories in a systematic framework relying heavily on the proposition that cognitions mediate behavior. At the same time it needs to be emphasized that many of the social learning interventions depend on performance procedures, derived from the learning aspects of social learning theory.

Applications

Social learning has been applied to career development, resulting in career development models and interventions. John Krumboltz and associates (i.e., Krumboltz, Mitchell, and Jones 1976; Mitchell, Jones, and Krumboltz 1979) have developed a social learning approach to career development. Like many career development theories based on a trait and factor perspective, the social learning approach identifies personal and environmental characteristics that influence career decision making. The major differences between social learning and traditional career theories have to do with the explicit description of these characteristics and the outcomes associated with the interactions of these characteristics. The social learning theory may be summarized as follows: Individuals bring certain inherited qualities (e.g., race, gender, physical appearance), special abilities (e.g., intelligence, physical coordination), unique learning experiences (e.g., instrumental, observational, and associative learning experiences), and task approach skills (e.g., mental set, cognitive strategies, performance standards) to environments that are characterized by specific conditions (e.g., job opportunities, training opportunities, social policies, labor laws, role models, educational systems). The personal characteristics and environments interact to produce outcomes: generalized self-views (preferences) with accompanying task approach skills (e.g., coping skills, interpretive strategies) leading to specific actions and consequences that alter future actions.

In this approach, a preference (cognitive representation) for a particular occupation, selling, for example, can be related to past learning experiences (antecedent events) in which an individual received positive feedback about his or her persuasiveness. Such cumulative experiences may lead an individual to enroll in a certain educational program in business. Once in the program, the individual may have negative learning experiences and receive less than positive evaluations (consequence) resulting in a change of educational or occupational preference and so on.

As can be seen from the above summary, action outcomes grow out of self-observation generalizations. These self-views are acquired from the past learning histories involving the interaction of various personal attributes and environments and, in turn, are modified by current experiences. Based on social learning, Krumboltz and associates have developed several propositions about career development, an example of which is: persons are likely to express a preference for certain activities if those individuals have been positively reinforced for engaging in efforts associated with the successful performance of a pertinent activity.

Another social learning application involves the use of self-efficacy theory (Bandura 1977). This theory recognizes the impact of personal beliefs concerning one's ability to perform a task or behavior successfully in ongoing career development. Hackett and Betz (1981) applied the self-efficacy theory to women in order to foster a greater understanding of women's career development. That is, it is suggested that through different reinforcement histories and exposure to different role models, women as opposed to men are likely to hold low self-efficacy expectations regarding behaviors required for the successful pursuit and performance of occupations traditionally viewed as more appropriate for males. Betz and Hackett (1981), studying undergraduates, found support for their suggestion; namely, females reported high self-efficacy levels with respect to "traditional" occupations and lower levels with "nontraditional" occupations, while males reported equivalent self-efficacy levels across occupational types.

A final application is in the area of interventions. Krumboltz and his colleagues have conducted studies on learning procedures to foster information-seeking behavior (e.g., talking to employees, reading occupational information). These procedures included verbal reinforcement (Ryan and Krumboltz 1964) and verbal reinforcement plus modeling (Krumboltz and Schroeder 1965). Krumboltz and Thoresen (1964) showed that verbal reinforcement and model reinforcement procedures could be used in group as well as individual counseling. Following these general outcome studies, Krumboltz and associates conducted more microanalytic studies focusing on the role of model characteristics in promoting change--prestige (Krumboltz, Varenhorst, and Thoresen 1967), gender (Thoresen, Krumboltz, and Varenhorst 1967), competence (Thoresen, Hosford, and Krumboltz 1970), and ethnic group identification (Stilwell and Thoresen 1972). Although it is difficult to draw uncontested conclusions from these modeling studies, most of the results support a model reinforcement intervention as an effective means of increasing information-seeking behaviors.

Cognitive Restructuring

Theory

The cognitive renaissance has also affected therapeutic psychology. Many cognitively oriented therapists could be mentioned (e.g., Kelly 1955; Rotter 1954; Frank 1973), but three approaches seem to be more prevalent in the literature: Rational-Emotive Therapy (RET) (Ellis 1962), Cognitive Therapy (Beck 1976), and Cognitive-Behavior Modification (Meichenbaum 1977). Each approach

adopts a constructivist position: a perspective that places a heavy emphasis on hypothetical processes called cognitive processes between input and output. Although these approaches emphasize a mediational approach, each emphasizes different mediators. For instance, Ellis feels that irrational beliefs (e.g., the belief that it is a dire necessity for adults to be loved by everyone for everything they do) cause and sustain emotional disturbance and maladaptive behavior, while Beck stresses faulty thinking styles (e.g., faulty inferences without evidence). Meichenbaum, on the other hand, attends to internal speech, self-statements, and coping skills. As described, all three focus on cognitions, but seemingly conceptualize them differently from content-based conceptions (irrational beliefs) to strategy-based conceptions (faulty thinking styles, coping skills). In terms of language theory, some pay attention to surface manifestations (self-statements), while others are concerned with deep structures (beliefs, thinking styles).

Another similarity concerns their use of cognitive-behavioral methods in generating new thoughts and behaviors, resulting in new cognitive structures and effective behavior. Ellis relies on rational analysis, homework assignments, imagery, and logical persuasion in the identification and remediation of irrational beliefs. Beck also uses many of these Ellisonian methods including homework assignments, but more emphasis is put on behavioral methods, such as activity schedules and graded-task assignments, as opportunities for gathering data to test assertions rather than as an occasion for rational disputation. Meichenbaum, while similar to both Ellis and Beck, seems to be less dependent on the rational or empirical analysis of irrational beliefs or assertions. Rather, he emphasizes the direct teaching of coping skills, including replacing maladaptive self-statements with coping statements.

In summary, these various conceptions focus on restructuring particular cognitive frameworks that are related to self-preoccupation and negativity and assumed to be responsible for cognitive, behavioral, and emotional disorders. Cognitive restructuring therapy or counseling uses performance-based interventions in order to modify cognitive experience such that adaptive and creative functioning is enhanced. For example, Beck has identified a self-castigating, pessimistic, and hopeless cognitive set as the core of depressive symptomatology, resulting from the perception of personal loss. These distorted cognitions can precipitate sadness that, in turn, is construed in a negative manner. Such circular effects among depressive cognitive, affective, and behavioral processes can lead to the development, maintenance, and downward spiral of depression unless the cycle is interrupted through therapeutic procedures, such as becoming aware and testing the validity of one's cognitive distortions through completing various tasks.

Applications

It appears that most of the work in vocational psychology has been directed at choice behavior. Some suggestions about the usefulness of restructuring procedures in this traditional aspect of vocational counseling have been made (Thompson 1976), but a restructuring perspective also potentially offers helpful suggestions about a broader variety of career counseling concerns (see Keller, Biggs, and Gysbers 1982; Weinrach 1980).

Osipow (1979, 1983) strongly recommends that counseling psychologists broaden their interests in the career realm and become involved in occupational mental health in which occupational stress is often an important factor in serious health disorders. Weinrach (1980) suggests that Rational-Emotive Therapy (RET) provides workers with procedures to reduce stress. The RET approach can teach them a simple system for understanding stressful work-related experiences by relating thoughts, feelings, and acts (activating experience-beliefs-consequences). In this system, workers come to understand that beliefs about work can largely influence how they react and feel on the job. Often workers come to hold beliefs that are unattainable ("My supervisor should act professional at all times." "I can't stand criticism; it's a horrendous experience that I can't possibly endure."). Such beliefs tend to convert productive worker feelings--disappointment, annoyance, apprehension--about aspects of the job such as supervisors and their evaluations into non-productive and intense feelings of depression, anger, and fear. Possibly, little can be done about job supervision or evaluation per se, but RET can teach workers to take responsibility for their emotional reactions by realizing their desires ("I would like my supervisor to act more professional." "It is annoying to be evaluated.") are not always going to be met. In this light, when desires are not met, such productive emotions as disappointment arise rather than self-defeating emotions resulting from overly demanding and unattainable absolutes. In sum, although Ellis or Beck would suggest many other cognitive-behavioral strategies for dealing with resolvable career problems, the application of restructuring methods highlights the relationship between dysfunctional cognitive schemes and career disturbance.

Another application of restructuring theory to the work world concerns the development of stress management programs for such highly stressful occupations as law enforcement. One application has been in the area of intensive care unit (ICU) nursing (see Claus and Bailey 1980). In developing stress management programs for ICU nursing, training modules can be created on the basis of survey results from the ICU nurses (e.g., Grout, Steffen, and Bailey 1980; Stone et al. 1982). Based on surveys of ICU nurses at the University of Iowa Hospitals and a community hospital, Stone et al. proposed a program based on stress-inoculation training (Meichenbaum 1977).

Procedurally, stress-inoculation training consists of three phases: education, skill training, and application. Adapting each phase to the critical care situation resulted in the following proposed program.

During the educational phase, nurses/students develop a conceptual and personal awareness of the nature of job stress (Maslach 1979). Borrowing from the literature, a model of stress (e.g., Lazarus 1966) that emphasizes the relationship of perception (cognitive appraisal) to stress is explicated. During these educational activities, special attention is paid to the relationship of work environment appraisals and job stress, that is, how easily nursing environments become dehumanized for distressed nurses.

In the skill phase, effective coping skills (active relaxation, physical exercise, and various cognitive responses of avoidance, disengagement, and humor) are described and opportunities for practice provided. Based on the survey data mentioned earlier, reliance on certain active problem-solving

skills (e.g., "Talk it out with others." "Take some definite action." and "Seek more information.") seems especially relevant.

In the application phase, the use of an interpersonal group situation to discuss and share one's job-related reactions seems worth considering as a way of applying the information and skills acquired in the first two phases. The development of networks provides a temporary experience or moratorium for individuals to share reactions, rehearse skills, and develop peer support.

Such job-stress reduction programs have been implemented (Claus and Bailey 1980) and seem particularly relevant to those counseling psychologists who wish to pay more attention to their consulting roles and traditional issues of work adjustment and job satisfaction.

Cognitive Developmentalism

Theory

Cognitive developmentalism, an outgrowth of the cognitive development work of Piaget (1959) and Erikson's view of life-stage development (Erikson 1963), is a term designating a collection of cognitive developmental models. The models have at least two similarities; namely, they adopt a stage approach to development and a constructivist explanation of personality. As discussed previously, a constructivist position focuses on cognitive structures and activities that act as filters in helping people perceive, organize, and evaluate the meaning of events.

Describing people's cognitive processing in terms of developmental stages implies an invariable sequence in which each stage is defined by distinct and qualitatively different cognitive activities and organization. Each stage is conceptualized to be differentiated from another by the structural nature of the cognitive organization, with each stage building on, incorporating, and transforming the previous one and preparing for the next one, resulting in a hierarchical organization. Generally, higher stages of cognitive development represent increasing levels of differentiation and integration and decreasing levels of egocentricity and categorical thinking.

A number of cognitive developmental models have been discussed: cognitive complexity (Harvey, Hunt, and Schroeder 1961), moral development (Kohlberg 1969; Rest 1974), ego development (Loevinger 1976), and social development (Selman and Kohlberg 1976). Of particular value, at least as suggested in the career development literature, are Perry's model of intellectual and ethical development (Perry 1970) and Bieri's use of cognitive complexity in clinical and social psychology (Bieri et al. 1966).

The Perry scheme is similiar to the other models that adopt a cognitive stage approach; namely, development generally occurs in an irreversible sequence of stages in which each stage represents a qualitatively different structure or set of assumptions. Perry, in working with male undergraduates at Harvard, found that individuals at different developmental stages have

different views about the nature of knowledge, learning, and values. According to his findings, students pass through nine positions in their intellectual and ethical development.

In general, these positions represent a hierarchy of movement from a simple and categorical view to a complex pluralistic perspective. These nine positions can be grouped into three general categories: dualism (information classified as right or wrong; no ambiguity), relativism (relative options; no absolute notions), and commitment (responsibility to select an identity within a pluralistic context).

On the other hand, cognitive complexity theorists emphasize different information processing structures. Some theorists such as Harvey, Hunt, and Schroeder (1961) focus on integration involving the conceptual rules for combining and organizing information, while others view cognitive complexity as differentiation, referring to the number of information categories extracted from a given domain, suggesting that highly differentiated cognitive structures in one domain, such as literature, do not necessarily suggest high differentiation in architecture. The major premise in cognitive differentiation derived from Kelly's work (1955) on constructs is that behavior is to a large degree influenced by the personal constructs of the individual. Bieri (1955) introduced the concept of relative differentiation in that the cognitively complex person has available more dimensions or meaning categories with which to process information about the world than less cognitively complex persons. Most cognitive complexity research (e.g., Bieri et al. 1966) has been concerned with clinical and social judgment behavior. Much of this research rests on the assumption that cognitively complex persons, in comparison to their less complex counterparts, are more accurate judges and make "better" decisions, as a result of their ability to make finer discriminations among informational elements.

Applications

As in social learning, career counseling theorists have adapted theory, in this case cognitive developmentalism, to career development (Blocher and Siegal 1981). From these adaptations have come a career development model and an approach for designing career counseling interventions.

Knefelkamp and Slepitza (1976) have adopted Perry's model of cognitive development as a guide for understanding career development. That is, just as Perry found that students view subject matter and authorities in different and measurable ways, Knefelkamp and Slepitza assume that careers and career decision making can be viewed in different and measurable ways. Basically, their model describes the movement of a student from a simplistic, categorical view of career decision making to a more complex, pluralistic view across nine areas of qualitative change.

These authors contend that, as students move upward along the scheme, they will exhibit qualitative changes in career decision making. These changes could be from an external orientation to a more inner-directed view with increased ability to accept responsibility (locus of control, ability to

assume responsibility), from thinking in absolutes and stereotypes to thinking in cognitively complex terms (analysis, synthesis, semantic structure, self-processing, and openness to alternatives), and from self-absorption to a mature focus on mutual interdependence and increased capacity to empathize with others (role taking, risk taking).

In terms of career development, lower-stage, dualistic thinking students are controlled by the environment. In their belief about the "only one right career," these students turn to external authorities of parents, teachers, counselors, interest inventories, or various environmental and social indicators to define career identity.

As students develop, they become increasingly aware of the possibility of making wrong choices. In the multiplicity stage, the student shifts from an absolutist position about "one right career" to the decision-making process provided by a counselor. In this shift, the student considers a wider variety of factors, although they are primarily external, resulting in increasing anxiety and complexity.

When students move into relativism, external influences continue to be helpful but students now become the prime focus in the decision-making process. As students reach higher levels of processing, they analyze and synthesize many diverse aspects of career decision making, forming individual resolutions of the process. As a result, students accept more responsibility for their career decisions.

Finally, as students begin to accept personal responsibility for career decision making, they begin to experience personal commitment in the process. At first, commitment may be experienced as a narrowing of alternatives, but later, committed students come to understand the interrelationship of personal identity, values, and career development.

Preliminary data (Knefelkamp and Slepitza 1978) seem to support the existence of the described areas of qualitative change. Evaluations of college students also support the developmental movement within each area, such as from dualism to relativism. Moreover, developmental patterns seem to be associated with college progression: most university freshmen are at stages two and three; university seniors at stages three, four, and five; and advanced graduate students at stages six and seven.

A major assumption of the Knefelkamp-Slepitza model is that level of cognitive complexity affects the way a person approaches the career development process. Other researchers (Bodden 1970; Bodden and James 1976; Bodden and Klein 1972, 1973; Haase et al. 1979) have been interested in relating cognitive complexity to the vocational choice process. Bodden and associates (Bodden 1970; Bodden and Klein 1973) found that, for male college students, cognitive differentiation is positively related to appropriateness of vocational choice where appropriateness of the expressed vocational choice involved the congruence of measured vocational preference in terms of Holland's scheme (Holland 1966). This finding seems related to the suggestion of cognitive complexity theorists that complex individuals are more capable of making finer discriminations leading to potentially more accurate decisions.

Although these cognitive developmental applications, focusing on general career development or the specifics of vocational choice, are descriptive, and for the most part based on male college students, these associations may lead to some useful guidelines for designing interventions. That is, vocational interventions may need to be developmentally organized according to the needs of the client as determined by their stage. The goal of such developmental interventions in the vocational area is clear. These developmentally oriented interventions are to promote cognitive complexity, leading to many desirable consequences including more adequate vocational decisions (e.g., Bodden 1970).

One career counseling intervention has to do with the application of cognitive-developmental theory to the counseling of women (see Knefelkamp, Widick, and Stroad 1976). Women, since they differ developmentally as individuals in terms of their views of the career development process, may require a different career counseling approach. For instance, a dualist-thinking group of women, believing in "one right role" ("My place is in the home." "A profession is the only path." "Salvation is in education."), may need to be exposed to diversity through such books as Pathfinders (Sheehy 1981) and interviewing women with different work roles and perspectives. Such exposure can foster empathy with divergent points of view. On the other hand, a group of women already recognizing diversity does not need exposure to diversity per se, but needs to integrate different factors, such as time commitments, ability, work demands, and personal identity as a woman in the work world, which underlie various career paths, and come to some tentative resolutions. In time, these resolutions need to be discussed vigorously with others in order to assess costs and benefits. In sum, each of these differing groups needs the support and challenge of developmentally appropriate career counseling interventions to help themselves toward cognitive processing at a higher level in the vocational realm.

Implications for vocational counseling are also apparent from the results of studies on vocational behavior using cognitive complexity. The first finding about male students described earlier, concerning the positive relationship between cognitive complexity and congruence of vocational choice, led to an emphasis on one aspect of career counseling--providing information.

Bodden and Klein (1973) found that disliked occupations elicited more differentiated ratings than liked occupations. Later, Bodden and James (1976), assuming that increases in cognitive complexity were associated with desirable consequences, tested the proposition that provision of occupational information may increase complexity. Contrary to expectations, provision of occupational information reduced cognitive complexity.

In light of these previous results, as well as the relevance of cognitive complexity to vocational choice, the tendency for occupational information to reduce complexity, and the more differentiated responses to negative information, Haase et al. (1979) suggested that vocational counselors become more discriminating in information dissemination and use sources of occupational information that include disadvantageous aspects as well as the positive or neutral aspects typically found in some occupational material (e.g., Occupational Outlook Handbook). In so doing, Haase et al. (1979) hypothesized that, if negative as well as positive information were provided, then differential

changes in complexity would be observed. The results of their study supported the impact of type of information on cognitive complexity, with students exposed to mixed or negative information displaying greater complexity than students exposed to positive information only. Thus, it seems to be a useful guideline for career counselors in designing informational interventions, to consider presenting both positive and negative information in order to stimulate more complex cognitive processing.

Summary

This section suggests that career development can be profitably placed in the larger context of cognitive-behavioral theory. Three cognitive-behavioral theories--social learning, cognitive restructuring, and cognitive developmentalism--were briefly described. In these theoretical descriptions, it became clear how important constructive cognitive processes are in the explanation of human behavior. At the same time, each of these theories conceptualizes these internal processes differently; social learning and cognitive restructuring theories discuss cognitive processes in the context of learning theory and behavioral procedures, while cognitive developmentalism places discussion of cognitive processes in the context of developmental psychology. While social learning theorists talk about general information mediators and beliefs about personal effectiveness, cognitive developmentalists attend to conceptual rules and stages of cognitive development. Among the restructuring theorists themselves, such cognitive mediators as irrational beliefs, faulty thinking styles, and coping skills are proffered.

After each theory description, applications to career development were explored. From social learning, Krumboltz and associates have developed a model of career development and pioneered in the promoting of social learning-based interventions concerned with information-seeking behavior. Recent social learning applications concern self-efficacy and the career development of women. Cognitive restructuring applications in the areas of occupational mental health and stress management programs suggest promise in broadening career counseling concerns. Cognitive developmentalists in the career area remind us that people, male and female, may require different types of career counseling depending on their stage of cognitive development in the area of careers.

Of course, many aspects of the application of a cognitive-behavioral perspective to career issues were not addressed, such as Barak's (1981) work on vocational interests and the works in the area of cognitive style and career behavior (e.g., Kivlighan et al. 1981), and applications having to do with human judgment that will be discussed in the next section of the monograph.

What are the challenges that lie ahead for cognitive-behavioral theorists interested in career issues? Although a great need exists for the development of sound measures of cognitive change and more longitudinal research on "important career problems," this essential litany advocating improved measures and research has been sounded a few times in the past to say the least. At the same time that improved technology and research are called forth, one

must stress the importance of "good ideas." With this in mind, here are five conceptual challenges.

- How do we relate the individually focused theory and applications of a cognitive-behavioral approach to career issues such as unemployment, sex bias, racism, ageism, and others that seem to be enmeshed in social, cultural, and economic systems?

- How do we relate cognitive career applications that emphasize information seeking when data suggest that information seeking is less than essential for career problems (e.g., Barak, Carney, and Archibald 1975)? That is, how do we incorporate the processing of information into career counseling?

- How do we relate career theories and interventions that are based on white male college students to men and women from different ethnic and social backgrounds at different stages of development?

- How do we escape the unidirectional thinking (progression) and value-laden typologies (high versus low conceptual level) typical of cognitive developmentalism? That is, how do we acknowledge the possibilities of developmental regression, individual variability, and moratorium needs concerning our thinking and planning about careers?

- How "rational" are career issues?

In terms of the last challenge, the next sections concern applications that promise to enrich our understanding of career development through rational means.

CAREER DECISION MAKING

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The purpose of this section is to review both theoretical and practical discussions about personal vocational decision making--the processes people employ when faced with the opportunity or requirement to change work roles. It will focus on vocational decisions--decisions about work roles. It is acknowledged that other decisions are often included as a part of career development (Super 1980). The first section is a review of recent theoretical statements construed largely to describe individual vocational decision-making processes. The second section includes activities proposed as aids to personal decision making. Most are extrapolated from research and theory on psychological decision making, but a few originated in vocational guidance settings. The literature will be summarized and implications for future theory and research will be suggested.

A few distinctions in terminology are important. This paper will discuss only personal decisions, that is, situations where the individual decision maker must bear the consequences of action taken rather than situations where the consequences have little direct effect on the decision maker's experience. Personal decisions vary along at least two dimensions: (1) the decision situations faced and (2) the information-processing capacities of the decision maker. Decision situations have many characteristics, of which five seem especially important. Decisions are construed by the decision maker as (1) being single-staged or multi-staged, (2) involving one alternative to the status quo or several alternatives, (3) occurring under varying time constraints, (4) occurring under varying information constraints, and (5) having limited or wide-ranging effects on the decision maker. Recent research reviews (e.g., Payne 1982) have concluded that information processing in decision making, as in other areas of cognition, is highly contingent upon the demands of the decision situation.

Likewise, the decision maker's capacities have a bearing on decision-making processes. Two qualities seem worth considering: (1) Cognitive skills including memory, attention, and imagination as well as knowledge of decision heuristics and the ability to use computational aids, and (2) Motivational features such as the ego involvement or personal investment in the decision situation and intensity of approach-avoidance conflicts. Individual differences in decision-making styles, although an intuitively appealing idea, apparently have not been observed consistently in research across decision situations (Jungermann 1980).

Vocational Decision-Making Theory

Vocational decision making is the complex cognitive process by which people organize information about self and their vocational surroundings, deliberate among alternative perspectives about actions, and make a public commitment to action. The concept has been applied to vocational behavior in several ways; for example, Super (1973) declared that "decision making is essentially problem solving" (p. 287), while Heppner (1978) listed decision making as only one step in a general problem-solving process. The former viewpoint specifies that such activities as identifying the problem, generating alternatives, gathering information, and so forth are steps in decision making, while the latter viewpoint emphasizes decision making as the cognitive activity preceding human judgments and commitments--activity engaged in after the problem has been identified, most of the alternatives have been generated, and the information has been gathered. The latter view, assuming decision making is one step in the problem-solving process, will be adopted here largely because it is distinguishable from other themes in vocational development, such as vocational exploratory behavior and occupational knowledge that describe other steps in the problem-solving process, and because it is consistent with psychological decision theory and research.

Vocational decision making (VDM) should be distinguished from other popular concepts of vocational behavior such as choices, interests, values, and attitudes. Choices are indicators of VDM processes; that is, they are statements about activities or roles upon which the person expects to act. Interests are conceptions of affect expressed toward vocational activities and roles. Values are also affective expressions or preferences, but the object is the consequences or outcomes of activities and roles. Finally, vocational choice attitudes represent affect directed toward particular experiences or events that constitute the decision processes.

Vocational decision-making processes were first described in several theoretical models during the 1960s. These models served as conceptual frameworks or "schematic maps" based on the assumption that decision makers process information relevant to their goals and that a few functional categories are necessary in order to describe the processes involved. Often these concepts include those identified in the following summary:

> A decision-making conceptual framework assumes the presence of a decision maker, a decision situation (social expectation), and relevant information both from within and outside the person. The information is arranged into decision-making concepts according to the functions it serves. Two or more alternative actions are considered, and several outcomes or consequences are anticipated from each action. Each outcome has two characteristics: probability, or likelihood of occurrence in the future, and value or relative importance to the decision maker. The information is arranged according to a strategy so that the decision maker can readily recognize an advantageous course of action and make a commitment to this action. Strategies, also called rules or criteria, guide the assembling of the above concepts into an array so that straightforward judgments can reveal the commitment. Strategies

are not concepts but are structures. . . . (Jepsen and Dilley 1974, p. 332)

Most recent decision models also include the concept of costs, the financial, emotional, and effort expenditures required to implement an alternative action. The decision situation, as Tiedeman and Miller-Tiedeman (1979) pointed out, also involves intrapersonal stimuli.

Jepsen and Dilley (1974) compared eight models and concluded that, while they include several similar concepts, there are important differences in such basic assumptions as the amount of information available to the decision maker, the particular strategy being implemented by the decision maker, the level of precision in assembling and combining information, and the assumptions about time constraints held by the decision maker. The several models were found to be complementary and could be used to describe different types of decision situations faced during the course of vocational development. The eight models will not be reviewed again except where a model has been altered or expanded.

During the 1970s only one new set of formal models, Mitchell's (1975) reconceptualization of Restle's (1961) choice model, appeared in the vocational literature. The models are too complex to summarize here, but two departures from earlier models are noteworthy: (1) Mitchell's models are general enough to apply to a wide variety of decision situations, and (2) the decision situation is framed as that of placing oneself in a work role that approximates an ideal.

Vocational decision-making theory in the 1970s was buttressed by work in social psychology and behavioral decision making. Janis and Mann (1977) presented a complex conflict and stage-sequence model of decision making and used frequent illustrations with vocational content. The model is presented as a flowchart tracing elements in the decision process through three major events: (a) antecedent conditions that initiate the conflict; (b) mediating processes or psychological conditions, essentially cognitive activity; and (c) the consequences or various states of commitment to action. Another perspective on decision-making models was suggested by Ekehammar (1978), who hypothesized that decision making--construed as psychological cost-benefit--mediates the effect of background variables on vocational choices over the adolescent years. Mitchell and Beach (1976) and Pitz and Harren (1980) showed how utility-expectancy, information-processing, and decision theories applied to vocational situations but did not add new models.

Among those theorists who contributed vocational decision-making models in the 1960s, Tiedeman has made the most substantial modifications in recent years. Vocational decision processes were construed by Tiedeman and O'Hara (1963) as occurring in two periods further subdivided into seven stages. The periods distinguish between behaviors prior to and following instrumental action on the decision. The four stages in the Anticipation period are named, in order, Exploration, Crystallization, Choice, and Clarification; the three stages under Implementation are Induction, Transition, and Maintenance. Each stage represents a change in the dominant condition of the decision processes, that is, a qualitatively different psychological state appears for each

decision-making stage (e.g., Exploration involves considering relatively undifferentiated values and alternative actions).

Since 1967, Tiedeman and his colleagues (e.g., Tiedeman and Miller-Tiedeman 1979) have enriched their view of decision making to include three major shifts in emphasis: (1) an emphasis on "self-centering" processes, (2) the progressive restructuring of concepts--usually in an hierarchical fashion, and (3) an added emphasis on decision-making strategies.

Harren (1979a) presented an extensive model of career decision making applicable to typical undergraduate college students. Vocational decision making was treated as a major developmental issue for a population within a limited age range. He consolidated Tiedeman and O'Hara's (1963) decision stages into a four-stage sequence and added the idea of decision-making styles, the individual's characteristic strategy. He assumed that similar responses to different decision situations defined styles but did not test the assumption empirically as did the research Jungermann (1980) summarized.

Decision making has been construed recently as playing a major part in vocational development. Super (1980) described a prescriptive decision-making model, noting that it is a recurring phenomenon in life-span vocational development. Furthermore, he included the concept of decision making as a factor in his model of adolescent vocational maturity (Super 1974). Unfortunately, he did not elaborate on the concept but has developed an objectively scored inventory of decision making as part of the Career Development Inventory (CDI) (Super and Thompson 1979). Heath (1976) drew a parallel between his five dimensions of maturing and Tiedeman's stages in decision making (Tiedeman and O'Hara 1963).

Another recent trend involving VDM has been the application of cognitive developmental theory to vocational phenomena. The changing cognitive structures people use to process information about work and self were included as a part of Blocher and Siegal's (1981) cognitive-developmental theoretical framework. They postulated that decision-making models should specify the cognitive patterns that serve as sources of individual differences in information processing.

In summary, this sample of recent theorizing suggests that vocational decision-making models generally (1) have increased in complexity both in the particular models described (e.g., Tiedeman's model) and in the theories from which they were derived including conflict theory (e.g., Janis and Mann), psychological decision theory (e.g., Mitchell), information-processing theory (e.g., Pitz and Harren), and general cognitive development (e.g., Blocher and Siegal); (2) mediate the effects of social constraints and experience on long-term vocational development (e.g., Super); and (3) represent change as some combination of movement towards rationality (e.g., Pitz and Harren), increased self-centering (e.g., Tiedeman), and hierarchical cognitive restructuring of the problem (e.g., Tiedeman).

Aids to Vocational Decision Making

Decision-making psychologists seem to shy away from prescriptions for personal decisions (Jungermann 1980). They are likely to cite the complexity or seriousness of personal problems compared to the problems studied in laboratory or field settings. Furthermore, they recognize that decision-making behavior is highly contingent upon the particular characteristics of the decision situation (Payne 1982).

Nevertheless, findings from diversified applied research have allowed psychologists to construct suggested activities for personal decision making in the form of "decision theoretic aids" (Jungermann 1980). These "aids" are offered as heuristic techniques of an art form rather than algorithms with high certainty of "solving" personal problems. The "aids" have been devised to help decision makers break down their decisions into more manageable "bits" and "chunks," thus enabling them to process more information, apply more cognitive operations, and approximate rational ideas. The following list relies heavily on Jungermann's (1980) review of decision theory, Janis and Mann's (1977) conflict model, and the implications of decision theory for career counseling reviewed by Mitchell and Beach (1976) and Pitz and Harren (1980). The aids are presented in three groups arranged according to typical career guidance and counseling objectives.

Arriving at a New Commitment

Decision aids for people attempting to make a single-stage decision are generally of four kinds: (1) structuring the decision situation, (2) assessing values and beliefs, (3) providing accurate and complete information, and (4) evaluating the alternative options.

Structuring the situation. Clients often benefit from organizing their thoughts (so to speak) about the decision at hand. One way to specify the elements of a personal decision involves encouraging the clients to make explicit their cognitive simulation of the decision. This may take the form of mental "scripts" (Abelson 1976), that is, events in sequence involving the individual as actor or observer. Cartoon strips are often used as the analogue to describe "scripts" and, indeed, may suggest a useful decision aid. Clients could provide oral or pictorial descriptions of key decision events for two or three time periods, thus specifying the essential information they are utilizing and how it is being organized.

A general aid used to analyze decision structures involves constructing a decision-flow diagram, sometimes called a "decision tree," derived from decision analysis (Raiffa 1968). The diagram looks like a tree with the trunk representing the present course of action, the branching points are the decision situations, and the limbs represent the available alternative actions. Some diagrams include "toll gates" that represent costs. Each limb spreading from a branching point is often assigned a probability that represents the likelihood that traveling the limb, that is, taking a particular action, will lead to desired outcomes. Page (1974) advocated the application of decision trees in career guidance. (Examples of "trees" constructed from longitudinal

research data have been completed on Project TALENT subjects by Cooley and Lohnes [1968], and on Career Development Study subjects by Gribbons and Lohnes [1982].)

Constructing a decision tree aids the client in clarifying key decision concepts and identifying missing or misplaced information. Consider the following steps in constructing a tree and the knowledge required to perform the steps: (1) listing the decision situations as branching points requires knowledge of the sequencing of decision making; (2) listing alternatives as limbs requires knowledge of possibilities; (3) estimating costs at the "toll gates" requires knowledge about the alternatives; (4) assigning probabilities to the outcomes (i.e., the limbs) requires careful consideration of what might happen, how one can influence the outcomes, and so forth; and (5) determining values for eventual goals requires self-examination. Thus, constructing decision trees has merit for breaking down most complex decisions into manageable parts.

Familiar aids from creative thinking, such as brainstorming (Osborn 1957) or synectics (Gordon 1961), may be applied to expanding and pruning the list of alternative actions and specifying salient values, especially by directing attention to novel combinations of familiar ideas. Guided imagery or fantasies have been introduced to vocational counseling over the past decade (e.g., Skovholt and Hoenninger 1974) and recently have been shown to be associated with the production of alternative actions for career decisions (Sarnoff and Remer 1982).

Janis and Mann (1977) experimented with a procedure called the Balance Sheet, which provides an analytical vocabulary and a two-dimensional layout for portraying decision processes when a few alternatives are being considered seriously. After several experiments with varied decision situations, they concluded that the greater the number of errors in a Balance Sheet completed at the time of commitment (e.g., listing too few advantages and disadvantages), the greater the vulnerability to negative feedback when implementing the decision. The Balance Sheet can be used as a decision aid prior to commitment, the objective being to identify errors of omission and commission. Mann (1972) and Janis (1968) have used the Balance Sheet with high school seniors and Yale University seniors, respectively, prior to career decision situations and found that the procedure stimulated students to fill in gaps and reduced their past decisional regret.

Assessing values and beliefs. Three aids have been suggested to help decision makers examine the structure of their values. All are variations on what decision theorists call multiple-attribute utility analysis (Humphreys and McFadden 1980) or, in the terms introduced earlier, examining the several values salient to a decision situation. The first was described in detail by Aschenbrenner, Jaus, and Villani (1980). A hierarchical goal-structuring procedure was used to help West German youth choose among apprenticeship openings. Decision makers were asked to specify all aspects important in choosing an apprenticeship (that is, their values), to cluster the aspects according to their own criteria, and to arrange the clusters into an hierarchy. Two field

experiments demonstrated that the procedure contributed to students' consideration of more attributes of the jobs (i.e., values) before and after commitment and applying more cognitive operations to these attributes.

The second aid is based on Kelly's (1955) role repertory grid and has been used in Great Britain as a decision aid in vocational guidance. Smith, Hartley, and Stewart (1978) outlined the basic method and illustrated its possible applications with a case study. The grid methodology aims to map objectively the decision maker's own ideas about alternatives and the salient constructs about outcomes (similar conceptually to attributes and values).

A third aid--actually a set of aids--was developed originally for assessment purposes. A procedure based on Kreitler and Kreitler's (1968) "meaning model" was designed by Zakay and Barak (forthcoming) to "break down" indecisiveness into specific elements (i.e., decision concepts), and to help explain vacillation. The procedure was employed in Israel with college students choosing a major and ninth graders choosing a high school curriculum. The clients were asked to imagine their ideal major (or curriculum), discuss its attributes, and select from a list of attributes. Next, they were asked to order the attributes, give them an importance rating, and place them on an anchored scale. Finally, the actual alternatives were rated on the top ten attributes. The two experiments showed that the procedure was useful in revealing the level of vacillation, that is, the gap between the ideal and the preferred, and in assisting the decision maker to change the decision structure in order to reduce the gap.

Career decision simulations designed for assessment purposes also have promise as aids in clarifying values and beliefs. For example, the Simulated Occupational Choice (SOC) (Katz, Norris, and Pears 1978) asks people to identify their values, select from a prepared list of values, and then apply the selected values to choices among hypothetical occupations. Thus, the procedure is a useful aid in analyzing the role of values in decisions. A variation of SOC was developed as the Career Decision Simulation (CDS) by Krumboltz, Hamel, and Scherba (1982). Their major addition is an information search about specific fictitious occupations, such as "deptician" or "breandist." The authors suggest that the "best" decision makers are those whose search is guided by values. With this assumption in mind, the CDS may serve as an aid in breaking down the decision makers' values and their role in decision processes.

People have been helped with specific decisions by stimulating explicit expression of their beliefs and values--especially those values attached to the outcomes and the beliefs about subjective probabilities. Imagining future values or changes in values from those held today is a difficult task, especially for young people. A few aids have been tried and found successful under these conditions. The Outcome Psychodrama proposed by Janis and Mann (1977) has been used to help clients specify potential losses and gains that they might sustain. The counselor directs several psychodramatic scenes where the counselor plays the role of a friend and the decision maker plays the role of a person whose career has gone bad. The benefits of this decision aid are reduction of resistance to examining negative outcomes and stimulation of a more thorough information search before addressing the decision.

Another strategy is to challenge clients whose beliefs (e.g., subjective probabilities) show substantial biases (as compared to empirical evidence). Perhaps these challenges can take the form of Albert Ellis' (1962) familiar challenges to irrational beliefs. Rokeach (1973) listed several procedures for inducing change in values and beliefs largely through informing clients about contradictions among their set of cognitions. Young (1979) introduced his own version of a value confrontation where the person is presented with information about value orderings (e.g., the ordering of the values of logic and responsibility) and their behaviors (e.g., self-dissatisfaction with one's own career planning). Students with high internal control who were involved in value confrontation exhibited more information-seeking behaviors than students receiving verbal operant conditioning.

Janis and Mann's (1977) Balance Sheet has also served as the basis for other decision aids called "emotional inoculations." They hypothesized that if, before commitment, counselors provide information that makes an overlooked risk salient, the decision maker will be less vulnerable to postdecision regret. The information about occupations includes the probability of undesired outcomes. Complete and accurate information--including undesired outcomes as well as desired outcomes--thus emerges as a familiar decision aid.

Providing complete and accurate information. The provision of complete and accurate information about vocational options has long been the hallmark of vocational guidance. Recent research on organizational entry (reviewed by Super and Hall 1978) has helped to understand why "realistic" information helps people to increase the follow-through on commitments (i.e., reduce later job turnover) and to decrease postdecision regret. Realistic prior information--about both positive and negative outcomes--seems to be instrumental to the person's preparation for coping with the job and thus feeling less frustration (Ilgen and Seely 1974). The strategy of aiding vocational decision makers by providing realistic occupational information probably deviates from usual practices in that available information seldom emphasizes both positive and negative outcomes on all attributes (values) relevant to the decision maker. In a recent evaluation of occupational information resources and student usage, Chapman and Katz (1981) concluded that existing information about occupations (which is a poorly defined concept to be used as an alternative action in decision making) is not structured to allow students to examine a full range of positive and negative aspects. Their analysis of occupational information content revealed that many sources do not supply information about potential satisfactions--especially those related to values. The provision of complete and accurate (i.e., balanced) information may be a familiar decision aid, but apparently it will take more effort than reaching for familiar resources.

Evaluating options. When decision makers have displayed their alternatives along with the salient information about costs and outcomes, they are ready to evaluate the alternative options. At this point, decision algorithms, such as the subjective expected utility (SEU) model (Mitchell and Beach 1976), may be applied. This model suggests that decision makers choose the action with the highest sum for the products of subjective probabilities (i.e., expectancies) and values (i.e., utilities) for each outcome.

Jungermann (1980) cautioned that using mathematical models may be too heavily prescriptive or "look like magic" to the client. A few attempts have been made to supply decision makers with objective expectancies of probabilities (usually estimates of their "fit" with a finite list of alternatives expressed as roles, such as "students at college X" or "member of occupation X"), and to guide them through an SEU model. Such efforts in counseling about personal decisions--especially those using objective probabilities--are best viewed as providing information rather than suggesting a "best" commitment.

Bolstering a Career Commitment

Frequently, clients seek assistance in their efforts to maintain and implement career decisions when they aren't sure they can carry through with the commitments already made. Sometimes they feel concerned about whether their present choice is "right" or "the best." Most aids for this type of decision have been derived from work with "bad habits" such as smoking, overeating, and alcohol abuse.

The decision aids help people to scrutinize their commitment to change and the prior decision processes for any apparent flaws. Jungermann (1980) suggested two kinds of aids: (1) those that help people to examine structural aspects of a decision, and (2) those that help to avoid volitional breakdowns.

Examining structure. The first example is designed to aid decision makers in examining decision structure by demonstrating "incrementalism" to them, that is, show how a series of seemingly small decisions that are not directly related to the commitment may lead to a point where only a simple, small step will result in abandoning the commitment. For example, people who steadfastly declare a desire to become physical therapists could be shown how the selection of high school courses that do not prepare them adequately for the key courses in college may eventually lead to a decision situation where it is easy to change the commitment. Thus, the decision maker learns how complex decisions are organized as a series of incremental steps.

A particular form of the decision tree, called the fault tree, helps to analyze where things can go wrong when a commitment is being implemented. This variety of decision tree derives its name from its purpose, to examine faulty alternative actions, that is, those that lead to undesirable consequences. The focus is limited to constructing alternative actions (i.e., limbs) that could lead to a new decision situation in which the original commitment is threatened. Constructing a fault tree helps demonstrate the series of incremental decisions that can lead an unsuspecting person away from the commitment.

Another use of the decision tree is to construct contingency plans for critical decision situations. At the key incremental decision branch points, limbs can be constructed that allow the client to anticipate the consequences of these critical decisions. An example might be showing people how a job interviewer creates new, unplanned limbs with "bait-and-switch" job offer tactics and how clients can respond constructively should they encounter such offers.

Volitional breakdowns. Volitional breakdowns may be avoided by anticipating which beliefs and values are salient in critical situations. Traditional desensitization procedures and other anxiety-reducing techniques are undoubtedly useful to people whose commitment is tested in critical situations. In addition, written contracts with counselors or others may help decision makers adhere to their commitments.

Decision makers often bolster their commitment through the formation of cognitive defenses. Janis and Mann (1977) listed a common set of rationalizations or defensive beliefs frequently used to bolster a commitment and reduce the stress of indecision. These tactics are (1) exaggerating favorable consequences, (2) minimizing unfavorable consequences, (3) denying aversive feelings, (4) exaggerating the remoteness of the action commitment, (5) minimizing social surveillance, and (6) minimizing personal responsibility. Janis and Mann hasten to add that these tactics may contribute to satisfying commitments only after a careful and thorough search for salient information and an unbiased appraisal of the information has taken place prior to addressing the decision situation directly. Employing such bolstering tactics in the absence of a careful search and appraisal could be extremely detrimental.

Acquiring Generalized Decision-Making Skills

Several decision "aids," usually in the form of a classroom curriculum, computer-assisted guidance programs, or a standardized small-group "model," have been prepared for counselors so they can "teach" decision-making skills. Three examples were derived from the vocational decision-making models reviewed earlier. The curriculum materials called Deciding (Gelatt, Varenhorst, and Carey 1972) were based on Gelatt's (1962) model. The computer-assisted guidance program called System of Interactive Guidance and Information (SIGI) (Katz 1974) incorporates elements from Katz' earlier model (Katz 1966). Harren's (1979b) handbook for facilitators of small groups is based on his modifications (Harren 1979a) of Tiedeman and O'Hara's (1963) model.

Setting aside the obvious difficulties in assessing the effects of such efforts, other cautions can be learned from decision theory research. People can be taught carefully defined decision behaviors (e.g., alternative listing), and probably cognitive decision strategies. The difficulty lies in the varied requirements inherent in everyday decision situations. For example, if the clients have successfully mastered the elements of a short-term, single-stage decision, will this prepare them for long-term, multiple-stage decisions? A dilemma begins to take shape for counselors: should they train for a broad range of anticipated decision situations, only some of which will be experienced, or should they train in general skills that seldom have direct application to experience?

Jungermann (1980) suggested that it is preferable to "teach" people such generalized "skills" as increased tolerance for ambiguity and uncertainty, a general cognitive flexibility, and an avoidance of biases. This advice sounds remarkably similar to Tiedeman's (1967) concern for the goal predicament of tentativeness versus commitment and the choice predicament of reflection versus implementation. While such broad suggestions--perhaps ideals--may seem

far too abstract to be included as "aids," nevertheless they serve as reminders to counselors that may help cope with the dilemma.

At least two specific aids were supported by Jungermann (1980): (1) role playing or decision simulations in order to prevent rigidity in the information search and processing and (2) a record-keeping system for documenting decisions in order to prevent distortions. A few examples of simulations have been tried out in school settings, for example, the Life Career Game (Boocock 1967). A variation on role playing called the Imaginary Friend (Warner and Jepsen 1979) yielded results that, in retrospect, are compatible with the hypothesized reduction in rigidity. In the Imaginary Friend activity, small-group members make up a fictitious group member and use the material about the "friend" to complete several small-group decision-making activities. Detailed examples of decision-making record-keeping systems as decision "aids" were not found, but brief examples have been incorporated into several decision-making curricula (e.g., Gelatt, Varenhorst, and Carey 1972; Miller and Tiedeman 1972).

Implications for Theory and Research

Theory and practice surrounding counseling with career decision makers has made considerable progress over the past twenty-five years. Continued progress will require further research using both conceptual and empirical methodologies. The following suggestions are offered based on the foregoing reviews.

Field Testing Decision Aids

Field tests have already begun for some decision aids such as the Balance Sheet (Mann 1972), hierarchical goal structuring (Aschenbrenner, Jaus, and Villani 1980), value confrontation (Young 1979), and guided imagery (Sarnoff and Remer 1982). Many aids remain at the stage of well-reasoned clinical hypotheses. Not all aids must be tested with all sorts of decision situations or decision makers. The crude taxonomy used in this paper suggests some limits; such as, test outcome psychodrama with people who are arriving at a new commitment.

The difficulty with this suggestion lies in the supposition that adequate outcome measures are available. This may be true for relatively narrow, short-term outcomes such as the number of alternatives generated, but for more complex or long-term outcomes, such as flexibility in information processing or intensity of postdecision regret, the measurement and design problems quickly increase. Despite these difficulties, a series of decision-aid experiments should narrow the conditions under which each aid is effective. This will provide feedback for applied VDM models and, at the same time, encourage wise selection of counseling practices.

Synthesizing Empirical and Conceptual Findings

Findings from the empirical research on decision aids seem to complement recent model building advances in VDM theory. At the simplest level there is an obvious parallel between the behavioral tasks associated with vocational decision-making stages (from the Janis-Mann and Tiedeman-O'Hara models) and the instructional objectives for decision aids. For example, Tiedeman's Exploration stage describes the decision maker's attempt to differentiate among values and options while the Clarification stage describes efforts to bolster commitments. The first two groups of decision aids described in this paper name very similar behaviors as the instructional objectives.

This apparently unplanned convergence of theoretical concepts with findings from field experiments suggests several research opportunities: (1) decision dynamics, that is, the sequential activity in making vocational decisions, can be studied in more detail by isolating conditions that facilitate or accelerate changes and (2) abstract theoretical concepts can be translated into specific behavioral indicators in a way that benefits theoreticians, researchers, and practitioners. For example, the concept of career exploration could be broken down into such a cognitive activity as differentiating values (as in hierarchical goal analysis) or attributes of outcomes (as in identifying constructs).

Another result may be improved assessment strategies, especially clinical data gathering and inference procedures, that will provide more detailed and helpful decision-making diagnoses. Hypothesis testing should be facilitated both as a part of the counseling process and in empirical research.

Using Descriptive Models to Bridge Disciplines

Vocational decision-making models may serve as a bridge along which intellectual traffic between social science disciplines can travel. Literature from social psychology, developmental psychology, industrial psychology, and cognitive psychology was found to be relevant in this review but contributions from sociology and economics and other areas of psychology (such as organizational, learning, and differential) could be explored further. For example, vocational decision-making models may describe the cognitive structures utilized at different life stages, but, on the other hand, these same models may describe alternative response patterns to different social stimuli (i.e., different decision situations).

Two theoretical viewpoints merit continued study and application. The conflict model introduced by Janis and Mann (1977) has obvious implications for counseling practice and research. It provides more than an anatomy of decision making; it is the kinesiology, too. Their flowchart model may even be used as an aid to teach sophisticated clients. Decision aids based on this model have been discussed and research hypotheses about the model and the aids have been initiated.

The Tiedeman and O'Hara (1963) paradigm, embellished and expanded over the past twenty years, now offers opportunities for practical applications and

empirical research. This particular VDM model has several possibilities: (1) inclusion of the model within a broader developmental theory is probably more feasible for this paradigm than it is for others and (2) this model may allow the assimilation of theory and research on vocational interests and values, exploratory behaviors, and vocational indecision into its present structure.

COMPUTERIZED APPROACHES TO FACILITATING CAREER DEVELOPMENT

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To understand oneself more fully, to comprehend the array of career opportunities available, and to construct intelligent plans for the relationship of oneself to one's opportunities have always been a difficult and troublesome set of challenges. Since Frank Parsons (1909) first gave them focus, most people have assumed that persons in need of help in facing these challenges are best assisted by an interpersonal process in which a wiser and more objective helper guides a less wise, more involved help-seeker toward insight and constructive action.

For the past quarter century, the erstwhile radical notion of using the computer to complement or to replace the interpersonal process in helping people plan their futures has been with us. In that span of time, the notion has grown measurably less radical, has won over most of its early opponents, and has even approached the status of commonplace. Dogged persistence on the part of a few of the pioneers of computer-assisted counseling and rapid advances in the technology of computers have led us to a time in which the availability of computerized approaches to career development is widely accepted.

The initial steps toward the current state were not motivated by concerns for improving the quality and quantity of career development services. Instead, an interest in applying systems theory to educational settings produced the first notions of how a computer might do some of what counselors were doing. In describing this early effort, Cogswell (1962) wrote:

> The problems uncovered pointed to conflicts in orientation between subsystems, breakdown in communication, ambiguity in the organizational structure, omissions and delays in the flow of data, and poor interaction between subsystems. (p. 5)

As his statement illustrates, Cogswell was principally interested in exploring the feasibility of transporting systems thinking to the public schools in order to improve efficiency and to increase the interaction between counseling and teaching functions (Bushnell and Cogswell 1961; Cogswell and Bushnell 1961; Cogswell and Estavan 1965).

The work of Cogswell and his colleagues provided the stimulus for Loughary, Friesen, and Hurst (1966) to pursue an additional goal using a computer-based counseling simulation. Feeling confident that a computer could be programmed to simulate counselor functions such as calculating grade-point averages, retrieving test scores, converting scores to predictions, and

reporting scores, they set about to simulate an actual client-counselor interaction and to test its efficacy. The interaction they chose was the educational planning (i.e., course selection) interview between counselors and ninth-grade students. While Cogswell and Estavan (1965) analyzed and simulated the counselors' preinterview appraisal activities, Loughary, Friesen, and Hurst analyzed and simulated the interview itself. The quality of students' course selections after using the simulation was compared to that of courses selected with the help of experienced counselors. Their analyses suggested that the counselors produced slightly superior course selections, but that the pupils were positive about the computer simulation and attributed to it more specific and factual information while attributing more personal information to the counselors. They ended their report with a statement of optimism about the role of the computer in the guidance services of the future and a note of caution about the need for sensitivity and intelligence among those who assume "the responsibility and the privilege of helping others with their personal problems and aspirations" (p. 15).

The appearance of the Loughary, Friesen, and Hurst article in a widely read journal signaled to the counseling and guidance specialty that serious work was underway toward utilizing the computer to improve guidance services. Since it was understood among counseling and guidance professionals that the available resources for counseling would never meet the need--as they perceived it--an air of cautious optimism about this promised innovation pervaded.

Serious work was under way. By 1966, a group of people engaged in the development of computer-based systems for vocational guidance had come together for their second annual symposium in order to share ideas and to commiserate about problems (Campbell 1966; Minor 1967). Reports of developmental efforts began to appear in the professional literature as Impellitteri (1967) described a Computerized Occupational Information System (COIS); Harris (1968) explained the nature of the Computerized Vocational Information System (CVIS); Minor, Myers, and Super (1969) described the rationale for the Educational and Career Exploration System (ECES); and Tiedeman and his colleagues began to circulate concept papers and technical reports about the Information System for Vocational Decisions (ISVD) (Tiedeman 1979). Though descriptions of the System of Interactive Guidance and Information (SIGI) were not widely available until a bit later (Katz 1974), informal reports and other documents were in evidence. By 1970, Super was able to assemble a small book of readings with which he sought to describe the status of computer-assisted counseling at that time.

Developmental programs increased in number as time passed and as enthusiasm for computer-based solutions to counseling problems grew. Within a decade of the first printed expositions of the radical notion, Harris (1974) and Harris and Tiedeman (1974) were able to discuss and classify twenty-five to thirty "computer-involved" guidance systems in existence or under development. Even prior to that, the National Vocational Guidance Association created a Commission on Computer-assisted Guidance Systems, which issued a report (Harris 1971) intended to inform the membership about such systems and to begin to set standards for their acceptability.

Guiding Assumptions

Though the developers of the early systems had varying objectives, differing resources, and aspirations that ranged from modest to grand, there was a noticeable similarity in the assumptions on which their work was based. The first of these was the assumption that career decision making was a rational process. Career development, in its most desirable form, proceeded along a course that was characterized by thinking correctly. (Parsons had called it "true reasoning.") Whims, intuition, impulsive actions, introjected aspirations of others, accidents, and the like had no place in the scheme. The impeccable logic and the invariable correctness of the computer added much to its value as the medium for delivering service intended to enhance development through straight thinking.

A second assumption held that information about the nature of opportunities was an essential and powerful ingredient in the improvement of career decisions and the subsequent increase in career development. The more one could know about the setting in which his or her future might be enacted, the better the thinking about that future. The fact that no human counselor could become or remain current about the arrays of occupations, schools, colleges and universities, military specialties, apprenticeship programs, and so on, was widely known and often lamented. The seemingly unlimited capacity of the computer to store information and to retrieve it rapidly was viewed as an asset too rich to ignore. If the computer were useful in no other way, its value to the career development enterprise would be sufficient. In fact, all of the early systems included the storage and retrieval of opportunity information as a prominent feature; in some systems it was the only feature.

A third, widely shared assumption was that self-awareness was essential to further development. Knowing about one's strengths, limitations, values, and preferences was a necessary prerequisite to success and satisfaction in the future. The computer could create a strategy for searching the files of opportunity information that was based on an individual's characteristics. Though the data required for matching people with opportunities and constructing a probability statement were scarce, the data that existed were easily manipulated by the computer.

Finally, there seemed to be a consensual endorsement of the value of exploratory activities in the processes of career development. Providing the users with the opportunity to consider their individual characteristics in conjunction with the realities of various opportunities was basic. Encouraging users to explore in that mode was also important. Hence, most systems specifically instructed the user to spend time repeating and modifying the exercises that permitted them to view self and opportunity together. Some systems advised the user to change the self-picture to facilitate further exploration. Most systems offered advice for expanding the number and kind of opportunities considered. While the early detractors of computer-assisted counseling systems argued that such systems would depend too heavily on the person-job fit, the developers of the systems gave evidence of strong commitment to the value of the user feeling permitted and encouraged to manipulate the self-opportunity consideration frequently and expansively.

The Current Scene

The movement of computer-based systems for career development from their early beginnings to their current state has been well documented (Cairo 1977; Clyde 1979; Harris-Bowlsbey forthcoming, a; Katz and Shatkin forthcoming; Shatkin 1980). Most of those who have sought to describe the computer-based systems of today agree that two kinds of systems are currently in use: career information systems and career guidance systems. Whether the two kinds are most accurately characterized by thinking of them as separate types or as occupying various points along a continuum is the subject of a mild current controversy. Nevertheless, there are differences among the systems in matters of scope and functions included. Katz and Shatkin (forthcoming) have suggested that the major functions are appraisal of the client, information about options, strategies for decision making, and planning. Harris-Bowlsbey (forthcoming, b) provided a somewhat longer list, including development of readiness, acquisition of self-data, translation of self-data to occupational alternatives, acquisition of occupational information, development of decision-making skills, reality testing, and implementation of choice. Regardless of whose list of functions one uses, clearly the information systems use the computer to assist in fewer of those functions than do the guidance systems. Until the controversy is settled, it seems useful to consider the two kinds of systems separately.

Computer-Based Information Systems

In his attempt to describe all the identifiable computer-assisted guidance systems in existence, Shatkin (1980) identified seventeen systems that can be safely classified as information systems. Of these, many were developed specifically for the jurisdiction in which they are used, and only four or five are widely disseminated. No convenient source provides data on how many agencies are currently using such systems or how many users or potential users have access to them. In a sample of 10 percent of the secondary schools in the United States, Chapman and Katz (1983) found that 24 percent had some kind of computerized occupational information system. By comparison 91 percent of the schools had occupational briefs and kits, and 98 percent had bound volumes of occupational information. However, such systems are not confined to schools alone; other agencies such as adult basic education centers, rehabilitation agencies, and youth employment programs also have them.

Perhaps the most important stimulus for wide-scale adoption of such systems was the establishment of a grants program in the Employment and Training Administration of the U.S. Department of Labor in 1975. This program funded computer-based systems in eight states. By 1980, the number had been increased to twenty-three states, and the program was administered by the National Occupational Information Coordinating Committee (NOICC). Maze and Cummings (1982) estimated that by March of 1982, forty-three states or local regions had adopted some computer-based information system.

In general, information systems concentrate on helping the user locate and retrieve information about options such as descriptions of occupations, descriptions of military specialties, listings of postsecondary educational

institutions, sources of financial aid, state and local employment opportunities, and sources of further information. Some systems include files intended to assist the user in preparing for occupational entry, identifying resources for career exploration, and finding local resource people.

Most information systems provide for either direct access to or structured search of the files. Direct access permits the user to specify an occupation or a postsecondary educational institution and retrieve information about it from the files. Direct access to the files works much like finding the topic in the index of a book and turning to the proper page (Tiedeman forthcoming). In structured search the user enters a set of characteristics or specifications and the system retrieves the appropriate occupation or educational institution according to a programmed strategy.

Since structured search depends upon the user to initiate the search strategy by entering personal data such as values or preferences, the user must necessarily be prepared by some form of self-appraisal. That is, the user must have a set of values, preferences, or other specifications that he or she is willing to own for the sake of reducing the filed information to that which will be useful. Most information systems accomplish this self-appraisal by use of a questionnaire or other paper-and-pencil device that provides the user with a self-picture on which the search is organized.

Generally, information systems do not use the computer to assist the user in self-appraisal. That function is accomplished with the questionnaire, with a counselor, or with some combination of the two. Similarly, most information systems do not use the computer to assist the user in the development of decision-making skills, in testing the reality of a tentative choice, or in implementing a choice, though some systems give attention to each of these.

The absence of self-appraisal, decision-making, reality-testing, and implementing exercises from information systems does not imply atheoretical approaches or shortsightedness on the part of their developers. A better inference is that the developers employed the computer to assist in those guidance functions which (1) the computer does best and (2) counselors and guidance programs do less effectively: store and retrieve information about the opportunity structure.

It is worth noting that the nature of the information that is stored, retrieved, and delivered by these systems is not beyond criticism. For the most part, government sources of occupational information are used and the recent questions about the efficacy and appropriateness of such information (see Stone, chapter 1, pp. 21, 23; and Jepsen, chapter 2, p. 37) go by and large unnoticed.

Computer-Based Guidance Systems

Although the categories of information systems and guidance systems may not be mutually exclusive, there are some demonstrable differences in at least the most widely implemented examples of each. As Harris-Bowlsbey (forthcoming, b) has pointed out, systems that emphasize guidance use the computer

to assist the user in self-appraisal, attempt to teach career development concepts at the terminal, and store records of the user's progress on the system; systems that emphasize information typically do not. On the other hand, information systems, for the most part, include state or regional labor market information, while guidance systems do not.

In general, the guidance systems can be described as more nearly complete systems in that their developers began with theoretical statements about the ideal process of career decision making and strove to include in their systems all the elements their theories prescribed (Harris-Bowlsbey forthcoming, a; Katz 1963, 1974; Tiedeman 1979). Because self-appraisal was considered to be the first and most essential part of the decision-making process, considerable attention was devoted to it. As with information systems, guidance systems use the results of self-appraisal to organize the structured search. However, in guidance systems the self-appraisal results remain central to the process after the information retrieval has been accomplished. Hence, the self-appraisal exercises designed for the guidance systems tend to be quite detailed and complex. The clarification of values, the measurement of interests, the estimates of strengths and limitations are all viewed as sufficiently important to deserve time on the terminal and additional user cost.

Similarly, the use of the information retrieved got more attention from the designers of guidance systems. The teaching of decision-making skills became an important goal, and complicated modules were designed to reach it. Testing tentative alternatives was addressed and seeking a decision-making strategy was included. Keeping track of where the user had been in the system, called system monitoring (Harris and Tiedeman 1974), and incorporating that record in the decision-making process were judged to have high value in enhancing career development. However, despite considerable enthusiasm for the system's capacity to monitor the user's movement through it, little use has been made of that capacity. This is especially lamentable in view of Jepsen's notions (Jepsen, chapter 2, pp. 41-44) about the need for continued progress in the theories about career decision making and the practice of career counseling. Monitoring the decision-making behavior of the users of computer-based guidance systems would clearly add measurably to that progress.

The inclusion of modules on self-appraisal, the use of information, decision-making skills and strategies, and system monitoring added to the richness and completeness of the user's experience. It also added to the time the user spent at the terminal, increased the user cost, and probably depressed the rate of adoption.

Of the many systems of this type under development in the 1960s, only two or three can be regarded as successfully adopted. Those that have not persisted were, variously, victims of the caprices of external funding, the high costs of the large computers and the telephone lines they required, and the excessive nature of their goals. For a description of all current systems see Maze and Cummings (1982) and Shatkin (1980).

Inquiry about Effects and Sequels

Despite a history of nearly twenty-five years, the use of computer-assisted career guidance systems has been subjected to surprisingly little inquiry (Cairo forthcoming; Clyde 1979; Harris 1974). One can only speculate as to why this is so. Perhaps part of the reason lies in the fact that the development and implementation of such systems have been such consuming activities that those most interested in inquiring about them have seldom had time, energy, and money left to sustain investigation. Another possible deterrent is the sheer complexity of career development as an organizing concept and the consequent difficulties in arriving at appropriate criterion measures that adequately represent it (Osipow 1982). Whatever the cause, enthusiasm for computer-assisted counseling systems clearly is not based on abundant evidence of their efficacy.

Acceptance

An early concern on the part of both developers and potential users was whether the systems would be accepted as reasonable additions to guidance services. Such concerns were quickly put to rest when the earliest studies began to appear (Harris 1972; Impellitteri 1968; McKinlay and Adams 1971; Myers et al. 1971; Thompson et al. 1970). The results indicated that users were enthusiastic about the systems, regarded their time at the terminal as a highly personalized experience, had no trouble making the systems work for them, and took advantage of opportunities to use the systems more than the prescribed amount of time. Furthermore, there were clear indications that parents of the users shared in the enthusiasm. It now seems obvious that these positive reactions were the product of two main advantages the systems provided: (1) they offered extra attention for the user on a subject of deep concern and (2) they presented an opportunity to manipulate ideas in a fashion that was intrinsically interesting. The latter advantage came to be known as "gimmick value," a phenomenon now quite familiar due to the availability of home computers and computerized games. More recent evidence of user acceptance can be found in Lambert and Caulum (1978), Richmond Unified School District (1977), and Welch (1978).

Simulating Specific Counselor Functions

Some of the earlier attempts to assess the effects of computer-based systems were focused on the effects of using a system instead of a counselor to accomplish specific guidance functions, such as course selection and test interpretation. What is perhaps the first such study was conducted at the Counseling Service at the University of Illinois by William Gilbert and Thomas Ewing; unfortunately their study was not documented. Loughary, Friesen, and Hurst (1966) first demonstrated that a system could be used effectively in helping high school students select their courses for the year that followed. Price and Johnson (1973) also compared use of a computer-based system (CVIS) with counseling by experienced counselors and found no differences in the students' understanding of the process, their reactions to the two methods, the quality of their course selections, or the numbers of their subsequent

schedule changes. Pilato and Myers (1973, 1975) tested various computer-generated methods of providing test feedback to high school students and demonstrated that, though there were some desired consequences for the accuracy of the students' self-knowledge and appropriateness of vocational preferences, these consequences were neither as extensive nor as durable as one would have hoped.

While the focus on these specific counselor functions probably served in some small way to increase the growing confidence in the computer as counselor, the circumscribed nature of outcomes studied kept the persuasive power of these studies at a minimum. Though selecting next year's courses and understanding the meaning of test results were presumed to be competencies that would facilitate career development, larger frames were needed for understanding the sequels to using the systems.

Enhancing Career Development

How one arrives at those larger frames is a question that is both well worth pursuing and, recently, well pursued (e.g., Fretz 1981; Holland, Magoon, and Spokane 1981; Oliver 1979; Osipow 1982). Few substantive issues in counseling and career development have received as much attention as has the question, "What are the appropriate outcomes of career interventions?" The prevailing opinion seems to be that in order to assess the sequels of career interventions adequately, one must broaden the concerns usually applied in psychological counseling, avoid the myth of uniformity (Kiesler 1971) as it pertains to client needs, and use multiple criteria. Such criteria include improving self-awareness, increasing vocational maturity, modifying educational and vocational alternatives, developing implementation skills, improving decision making, developing information-seeking skills, and improving career satisfaction (Osipow 1982).

Investigators of the effects of computer-assisted career guidance systems have, in the aggregate, shown sensitivity to the fact that career development concerns are broader than--or at least different from--those appropriate for psychological counseling. So, too, have they tended to use multiple criteria in order to understand what follows the use of a system. However, the notion that different clients need different interventions and/or respond differently to a given intervention has not guided this line of inquiry, except for the work of Melhus, Hershenson, and Vermillion (1973).

Most of the research has been done using high school students as subjects, though some studies have used college students (Chapman et al. 1977; Cochran et al. 1977; Melhus, Hershenson, and Vermillion 1973; Pyle and Stripling 1976). In both groups the outcomes of interest have been the precursors, constituents, or correlates of career maturity, such as planfulness, knowledge of resources for planning, decision-making skill, amount and accuracy of occupational information, self-awareness, commitment to goals, and confidence in decision making. For the most part criterion measures are made to order, but some investigators have used standardized instruments, including the Career Maturity Inventory (Pyle and Stripling 1976), the Harren Vocational Decision-making Checklist (Cochran et al. 1977), the Career Development Inventory

(Drake 1979; English 1974; Harris 1972; Harris-Bowlsbey, Rayman, and Bryson 1976; Myers et al. 1975), and the Assessment of Career Development (Harris-Bowlsbey, Rayman, and Bryson 1976; Maola and Kane, 1976). The use of control groups was the rule rather than the exception, and randomized assignment was used in most of the studies.

The accumulated results support the following assertions. Users of computer-based career guidance systems become--

- more aware of their need to make plans, more concerned with planning, and better able to integrate occupational information with their own characteristics;
- better informed about opportunities and more knowledgeable about how to find more information;
- inclined to consider more options for their futures; and
- in some cases, more appropriate in their vocational preferences (Cairo forthcoming).

Obviously, many of these assertions gain credence from the fact that people who get Treatment X are influenced by the elements of that treatment more than are the people who do not get it. It goes without saying that this zone of inquiry has not enjoyed the affluence that leads to replications. For all that, a substantial beginning has been established. That research which has been reported has been conducted with appropriate care and with thoughtful recognition of the complexities of the enterprise. The results of most of the studies suggest that some of the intended consequences were realized.

Concluding Remarks

Any attempt to describe the state of the art of using computer-based systems to enhance career development must be approached with humility and regarded as tentative. Serious work is still underway, and the pace of significant new developments seems to be quickening. The National Vocational Guidance Association has convened a second Commission on Computer-assisted Vocational Guidance Systems and that commission is at work on a second set of guidelines for the specialty (Harris 1971). An issue of The Counseling Psychologist devoted to computer-assisted counseling is in press. The National Occupational Information Coordinating Committee (NOICC) has spawned a system of state organizations (SOICCs), which meet regularly to improve information systems and to promote their use. A lively consortium, the Association of Computer-based Systems for Career Information, has formed and has published a detailed set of standards for such systems. Systems for the use of employed adults within organizations are under development (Minor, personal communication, May 1983; Phillips, Cairo, and Myers 1981). Perhaps most important of all, the availability of the microcomputer at a price most institutions can afford is converting the computer-based career development system from an interesting luxury to a widely available modern convenience.

Such systems are most likely to be a part of guidance and career development services for the near future. Though their efficacy has yet to be assured by a vast body of evaluative research, some impressive beginnings are available. Systems designers have given good evidence of their ability to manage the adaptation and evolution of the early systems. Acceptance of the idea has spread beyond the United States (Maze and Cummings 1982, Watts and Ballantine forthcoming). Meanwhile, concern for career success and satisfaction continues to grow, and there is little reason to expect that there will ever be enough counselors to attend to it.

REFERENCES

Abelson, R. P. "Script Processing in Attitude Formation and Decision-Making." In Cognition and Social Behavior, edited by J. S. Carroll and J. W. Payne. Hillsdale, NJ: Lawrence Erlbaum Assoc., 1976.

Alba, J. W., and Hasher, L. "Is Memory Schematic?" Psychological Bulletin 93 (1983): 203-231.

Aschenbrenner, K. M.; Jaus, D.; and Villani, C. "Hierarchical Goal Structuring and Pupils' Job Choices: Testing a Decision Aid in the Field." Acta Psychologica 45 (August 1980): 35-49.

Baldwin, J. M. Mental Development in the Child and the Race. 3d rev. ed. New York: Macmillan, 1906.

Bandura, A. Principles of Behavior Modification. New York: Holt, Rinehart and Winston, 1969.

Bandura, A. "Self-efficacy: Toward a Unifying Theory of Behavioral Change." Psychological Review 84 (March 1977): 191-215. (ERIC No. EJ 161 632).

Barak, A. "Vocational Interests: A Cognitive View." Journal of Vocational Behavior 19 (August 1981): 1-14. (ERIC No. EJ 248 329).

Barak, A.; Carney, C. G.; and Archibald, R. "Relationship between Vocational Information Seeking and Educational-Vocational Decidedness." Journal of Vocational Behavior 7 (August 1975): 149-157. (ERIC No. EJ 122 337).

Bartlett, F. C. Remembering: A Study in Experimental and Social Psychology. Cambridge, England: Cambridge University Press, 1932.

Beck, A. T. Cognitive Therapy and the Emotional Disorders. New York: International Universities Press, 1976.

Betz, N., and Hackett, G. "The Relationship of Career-Related Self-Efficacy Expectations to Perceived Career Options in College Men and Women." Journal of Counseling Psychology 28 (September 1981): 399-410. (ERIC No. EJ 250 898).

Bieri, J. "Cognitive Complexity-Simplicity and Predictive Behavior." Journal of Abnormal and Social Psychology 51 (1955): 263-268.

Bieri, J.; Atkins, A.; Briar, S.; Leaman, R.; Miller, H.; and Tripodi, T. Clinical and Social Judgment: The Discrimination of Behavioral Information. New York: Wiley, 1966.

Blocher, D. H., and Siegal, R. "Toward a Cognitive Developmental Theory of Leisure and Work." Counseling Psychologist 9 (1981): 33-44.

Bodden, J. "Cognitive Complexity as a Factor in Appropriate Vocational Choice." Journal of Counseling Psychology 17 (July 1970): 364-368. (ERIC No. EJ 022 747).

Bodden, J., and James, L. "Influence of Occupational Information Giving on Cognitive Complexity." Journal of Counseling Psychology 23 (May 1976): 280-282. (ERIC No. EJ 137 762).

Bodden, J., and Klein, A. "Cognitive Complexity and Appropriate Vocational Choice: Another Look." Journal of Counseling Psychology 19 (May 1972): 257-258. (ERIC No. EJ 058 832).

Bodden, J., and Klein, A. "Cognitive Differentiation and Affective Stimulus Value in Vocational Judgments." Journal of Vocational Behavior 3 (January 1973): 75-79.

Boocock, S. S. "The Life Career Game." Personnel and Guidance Journal 46 (December 1967): 328-334.

Bushnell, D. D., and Cogswell, J. F. "A Computer-Based Laboratory for Automation in School Systems." Audio Visual Communication Review 9 (1961): 173-185.

Cairo, P. C. Annotated Bibliography on Computer-Assisted Counseling and Guidance. Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, 1977.

Cairo, P. C. "Evaluating the Effects of Computer-Assisted Counseling Systems: A Selective Review." Counseling Psychologist (forthcoming).

Campbell, R., and others. Systems under Development for Vocational Guidance. A Report of a Research Exchange Conference. Columbus: Center for Vocational and Technical Education, The Ohio State University, 1966. (ERIC Document Reproduction Service No. ED 011 039).

Chapman, W., and Katz, M. R. Survey of Career Information Systems in Secondary Schools: Final Report of Study 1. Princeton, NJ: Educational Testing Service, 1981. (ERIC Document Reproduction Service No. ED 220 663).

Chapman, W., and Katz, M. R. "Career Information Systems in Secondary Schools: A Survey and Assessment." Vocational Guidance Quarterly 31 (1983): 165-177.

Chapman, W.; Katz, M.; Norris, L.; and Pears, L. SIGI: Field Test and Evaluation of a Computer-Based System of Interactive Guidance and Information. Volume I: Report. Volume II: Appendices. Princeton, NJ: Educational Testing Service, 1977. (ERIC Document Reproduction Service Nos. ED 146 222-223).

Clark, D. L. Rhetoric in Greco-Roman Education. New York: Columbia University Press, 1957.

Claus, K., and Bailey, J., eds. Living with Stress and Promoting Well-Being. St. Louis: C. V. Mosby, 1980.

Clyde, J. S. Computerized Career Information and Guidance Systems. Information Series no. 178. Columbus: ERIC Clearinghouse on Adult, Career, and Vocational Education, National Center for Research in Vocational Education, The Ohio State University, 1979. (ERIC Document Reproduction Service No. ED 179 764).

Cochran, D.; Hoffman, S.; Strand, K.; and Warren, P. "Effects of Client/Computer Interaction on Career Decision-Making Processes." Journal of Counseling Psychology 24 (July 1977): 308-312. (ERIC No. EJ 167 329).

Cogswell, J. F. The Systems Approach as a Heuristic Method in Educational Development--An Application to the Counseling Function. Santa Monica, CA: System Development Corporation, 1962.

Cogswell, J. F., and Bushnell, D. D. Report of a Preliminary Analysis of the Counseling and Pupil Personnel Data Processing Functions of a Southern California School District. Santa Monica, CA: System Development Corporation, 1961.

Cogswell, J. F., and Estavan, D. Explorations in Computer-Assisted Counseling. Santa Monica, CA: System Development Corporation, 1965. (ERIC Document Reproduction Service No. ED 010 582).

Cooley, W. W., and Lohnes, P. R. Predicting Development of Young Adults. Palo Alto, CA: American Institutes for Research, 1968.

Drake, J. "The Effects of a Computer-Assisted Career Guidance Support System upon the Vocational Maturity of Senior High School Students." Doctoral dissertation, Wayne State University, 1979.

Ekehammar, B. "Psychological Cost-Benefit as an Intervening Construct in Career Choice Models." Journal of Vocational Behavior 12 (June 1978): 279-288. (ERIC No. EJ 181 056).

Ellis, A. Reason and Emotion in Psychotherapy. New York: Lyle Stuart, 1962.

English, T. W. "A Comparison of the Effects of Two Methods of Disseminating Occupational Information on the Vocational Maturity of Senior High School Students." Doctoral dissertation, University of Connecticut, 1974.

Erikson, E. H. Childhood and Society. 2d ed. New York: Norton, 1963.

Frank, J. D. Persuasion and Healing. Rev. ed. Baltimore: Johns Hopkins University Press, 1973.

Fretz, B. R. "Evaluating the Effectiveness of Career Interventions." Journal of Counseling Psychology 28 (January 1981): 77-90. (ERIC No. EJ 238 360).

Gelatt, H. B. "Decision-Making: A Conceptual Frame of Reference for Counseling." Journal of Counseling Psychology 9 (Fall 1962): 240-245.

Gelatt, H. B.; Varenhorst, B.; and Carey, D. Deciding: A Study in Values. New York: College Entrance Examination Board, 1972.

Gordon, W. Synectics. New York: Harper, 1961.

Gribbons, W. D., and Lohnes, P. R. Careers in Theory and Experience. Albany: State University of New York Press, 1982.

Grout, J. W.; Steffen, S. N.; and Bailey, J. T. "The Stress Audit: Identifying the Stressors of ICU Nurses." Journal of Nursing Education 19 (June 1980): 15-25.

Haase, R. F.; Reed, C. F.; Winer, J. L.; and Bodden, J. L. "Effect of Positive, Negative, and Mixed Occupational Information on Cognitive and Affective Complexity." Journal of Vocational Behavior 15 (December 1979): 294-302. (ERIC No. EJ 210 633).

Hackett, G., and Betz, N. "A Self-Efficacy Approach to the Career Development of Women." Journal of Vocational Behavior 18 (June 1981): 326-339. (ERIC No. EJ 245 430).

Harren, V. A. "A Model of Career Decision-Making for College Students." Journal of Vocational Behavior 14 (April 1979a): 119-133. (ERIC No. EJ 199 302).

Harren, V. A., ed. Career Decision-Making for College Students: Facilitator's Handbook. Carbondale: Southern Illinois University Press, 1979b.

Harris, J. "The Computerization of Vocational Information." Vocational Guidance Quarterly 17 (September 1968): 12-20.

Harris, J. Toward Guidelines for Computer Involvement in Guidance. Washington, DC: National Vocational Guidance Association, 1971.

Harris, J. "Analysis of the Effects of a Computer-Based Vocational Information System on Selected Aspects of Vocational Planning." Doctoral dissertation, Northern Illinois University, 1972.

Harris, J. "The Computer: Guidance Tool of the Future." Journal of Counseling Psychology 21 (July 1974): 331-339. (ERIC No. EJ 102 278).

Harris, J., and Tiedeman, D. V. The Computer and Guidance in the United States: Past, Present and a Possible Future. Paper presented at the 18th Congress, International Association of Applied Psychology, Montreal, Quebec. DeKalb: ERIC Clearinghouse on Career Education, Northern Illinois University, July 1974. (ERIC Document Reproduction Service No. ED 095 372).

Harris-Bowlsbey, J. "The Computer and the Decider." Counseling Psychologist, forthcoming, a.

Harris-Bowlsbey, J. "The Role of the Computer in the Delivery of Systematic Career Guidance." In The Counselor and the Computer: Shared Roles, edited by J. Harris-Bowlsbey. Falls Church, VA: National Vocational Guidance Association, forthcoming, b.

Harris-Bowlsbey, J.; Rayman, J. R.; and Bryson, D. L. DISCOVER: A Computer-Based Career Guidance and Counselor-Administrative Support System. Field Trial Report. Westminster, MD: DISCOVER Foundation, Inc., 1976. (ERIC Document Reproduction Service No. ED 146 380).

Harvey, O. J.; Hunt, D. E.; and Schroeder, H. M. Conceptual Systems and Personality Organization. New York: Wiley, 1961.

Heath, D. H. "Adolescent and Adult Predictors of Vocational Adaptation." Journal of Vocational Behavior 9 (August 1976): 1-18. (ERIC No. EJ 144 271).

Heppner, P. P. "A Review of the Problem-Solving Literature and Its Relationship to the Counseling Process." Journal of Counseling Psychology 25 (September 1978): 366-375. (ERIC No. EJ 220 890).

Holland, J. L. The Psychology of Vocational Choice. Waltham, MA: Blaisdell, 1966.

Holland, J. L.; Magoon, T. M., and Spokane, A. P. "Counseling Psychology: Career Interventions, Research and Theory." In Annual Review of Psychology, vol. 32, edited by M. Rosenzweig and L. Porter. Palo Alto, CA: Annual Reviews, Inc., 1981.

Humphreys, P. C., and McFadden, W. "Experiences with MAUD: Aiding Decision Structuring versus Bootstrapping the Decision Maker." Acta Psychologica 45 (1980): 51-69.

Ilgen, D. R., and Seely, W. "Realistic Expectations as an Aid in Reducing Voluntary Resignations." Journal of Applied Psychology 59 (August 1974): 452-455.

Impellitteri, J. T. "A Computerized Occupational Information System." Vocational Guidance Quarterly 15 (June 1967): 262-264.

Impellitteri, J. T. Computer-Assisted Occupational Guidance: The Development and Evaluation of a Pilot Computer-Assisted Occupational Guidance Program. University Park: Pennsylvania State University, Vocational Education Department, 1968.

Janis, I. L. "Pilot Studies on New Procedures for Improving the Quality of Decision Making." Yale Studies in Attitudes and Decisions. Yale University. Mimeo. research report, 1968.

Janis, I. L., and Mann, L. Decision Making: A Psychological Analysis of Conflict, Choice, and Commitment. New York: Free Press, 1977.

Jepsen, D. A., and Dilley, J. S. "Vocational Decision-Making Models: A Review and Comparative Analysis." Review of Educational Research 44 (Summer 1974): 331-349. (ERIC No. EJ 104 905).

Jungermann, H. "Speculations about Decision-Theoretic Aids for Personal Decision-Making." Acta Psychologica 45 (1980): 7-34.

Katz, M. R. Decisions and Values: A Rationale for Secondary School Guidance. New York: College Entrance Examination Board, 1963.

Katz, M. R. "A Model of Guidance for Career Decision-Making." Vocational Guidance Quarterly 15 (September 1966): 2-10.

Katz, M. R. "Career Decision-Making: A Computer-Based System of Interactive Guidance and Information (SIGI)." In Measurement for Self-Understanding and Personal Development. Proceedings of the 1973 Invitational Conference on Testing Problems. Princeton, NJ: Educational Testing Service, 1974.

Katz, M. R.; Norris, L.; and Pears, L. "Simulated Occupational Choice: A Diagnostic Measure of Competencies in Career Decision Making." Measurement and Evaluation in Guidance 10 (January 1978): 222-232. (ERIC No. EJ 177 220).

Katz, M. R., and Shatkin, L. "Computer-Assisted Guidance: Concepts and Practices." Counseling Psychologist, forthcoming.

Keller, K. E.; Biggs, D. A.; and Gysbers, N.C. "Career Counseling from a Cognitive Perspective." Personnel and Guidance Journal 60 (February 1982): 367-371. (ERIC No. EJ 257 524).

Kelly, G. A. The Psychology of Personal Constructs, vols. 1 and 2. New York: Norton, 1955.

Kiesler, D. J. "Experimental Designs in Psychotherapy Research." In Handbook of Psychotherapy and Behavior Change, edited by A. E. Bergin and S. L. Garfield. New York: Wiley, 1971.

Kivlighan, D. M., Jr.; Hagaseth, J. A.; Tipton, R. M.; and McGovern, T. V. "Effects of Matching Treatment Approaches and Personality Types in Group Vocational Counseling." Journal of Counseling Psychology 28 (July 1981): 315-320. (ERIC No. EJ 248 316).

Knefelkamp, L. L., and Slepitza, R. A. "A Cognitive-Developmental Model of Career Development--An Adaptation of the Perry Scheme." Counseling Psychologist 6 (1976): 53-57. (ERIC No. EJ 158 471).

Knefelkamp, L. L., and Slepitza, R. A. "A Cognitive Developmental Model of Career Development--An Adaptation of the Perry Scheme." In Encouraging Development in College Students, edited by C. A. Parker. Minneapolis: University of Minnesota Press, 1978.

Knefelkamp, L. L.; Widick, C. C.; and Stroad, B. "Cognitive-Developmental Theory: A Guide to Counseling Women." Counseling Psychologist 6 (1976): 20-22.

Kohlberg, L. "Stage and Sequence: The Cognitive Development Approach to Socialization." In Handbook of Socialization Theory and Research, edited by D. Goslin. Chicago: Rand McNally, 1969.

Kreitler S., and Kreitler, H. "Dimensions of Meaning and Their Measurement." Psychological Reports 23 (1968): 1307-1329.

Krumboltz, J. D.; Hamel, D. A.; and Scherba, D. S. "Measuring the Quality of Career Decisions." In Assessing Career Development, edited by J. D. Krumboltz and D. A. Hamel. Palo Alto, CA: Mayfield Publishing Co., 1982.

Krumboltz, J. D.; Mitchell, A. M.; and Jones, G. B. "A Social Learning Theory of Career Selection." Counseling Psychologist 6 (1976): 71-81.

Krumboltz, J. D., and Schroeder, W. W. "Promoting Career Planning through Reinforcement." Personnel and Guidance Journal 44 (September 1965): 19-26.

Krumboltz, J. D., and Thoresen, C. E. "The Effect of Behavioral Counseling in Group and Individual Settings on Information Seeking Behavior." Journal of Counseling Psychology 11 (Winter 1964): 324-335.

Krumboltz, J. D.; Varenhorst, B.; and Thoresen, C. E. "Non-Verbal Factors in the Effectiveness of Models in Counseling." Journal of Counseling Psychology 14 (September 1967): 412-418.

Lambert, R. H., and Caulum, D. A. Wisconsin Career Information System. Annual Progress Report 1978, July 14, 1977 - July 13, 1978; Third Year of Operation. Madison: Wisconsin Vocational Studies Center, University of Wisconsin, 1978. (ERIC Document Reproduction Service No. ED 164 840).

Lazarus, R. Z. Psychological Stress and the Coping Process. New York: McGraw Hill, 1966.

Loevinger, J. Ego Development: Conceptions and Theories. San Francisco: Jossey-Bass, 1976.

Loughary, J. W.; Friesen, D.; and Hurst, R. "Autocon: A Computer-Based Automated Counseling Simulation System." Personnel and Guidance Journal 45 (September 1966): 6-15.

Mitchell, W. D. "Restle's Choice Model: A Reconceptualization for a Special Case." Journal of Vocational Behavior 6 (June 1975): 315-329. (ERIC No. EJ 122 259).

Myers, R. A.; Lindeman, R. H.; Forrest, D. J.; and Super, D. E. Preliminary Report: An Assessment of the First Year of Use of the Educational and Career Exploration System in Secondary Schools of Genesee County, Michigan. New York: Teachers College, Columbia University, 1971. (ERIC Document Reproduction Service No. ED 060 482).

Myers, R. A.; Lindeman, R. H.; Thompson, A.; and Patrick, T. "Effects of Educational and Career Exploration System on Vocational Maturity." Journal of Vocational Behavior 6 (April 1975): 245-254.

Oliver, L. "Outcome Measurement in Career Counseling Research." Journal of Counseling Psychology 26 (May 1979): 217-225. (ERIC No. EJ 223 134).

Osborn, A. Applied Imagination. 2d ed. New York: Scribner's Sons, 1957.

Osipow, S. H. "Occupational Mental Health: Another Role for Counseling Psychologists." Counseling Psychologist 8 (1979): 65-70.

Osipow, S. H. "Research in Career Counseling: An Analysis of Issues and Problems." Counseling Psychologist 10 (1982): 27-34. (ERIC No. EJ 275 911).

Osipow, S. H. Theories of Career Development. 3d ed. Englewood Cliffs, NJ: Prentice-Hall, 1983.

Page, E. B. "Problems and Perspectives in Measuring Vocational Maturity." In Measuring Vocational Maturity for Counseling and Evaluation, edited by D. E. Super. Washington, DC: National Vocational Guidance Association, 1974.

Parsons, F. Choosing a Vocation. Boston: Houghton-Mifflin, 1909.

Payne, J. W. "Contingent Decision Behavior." Psychological Bulletin 92 (September 1982): 382-402.

Perry, W. G., Jr. Forms of Intellectual and Ethical Development in the College Years. New York: Holt, Rinehart and Winston, 1970.

Phillips, S. D.; Cairo, P. C.; and Myers, R. A. "Computer-Based Career Planning for Adults." British Journal of Guidance and Counselling 9 (1981): 100-107.

Piaget, J. The Language and Thought of the Child. 3d ed. London: Routledge and Kegan Paul, 1959.

Pilato, G. T., and Myers, R. A. "The Effects of Computer-Mediated Vocational Guidance Procedures: Accuracy of Self-Knowledge." Journal of Vocational Behavior 3 (April 1973): 167-174.

Mann, L. "Use of a 'Balance Sheet' Procedure to Improve the Quality of Personal Decision Making: A Field Experiment with College Applicants." Journal of Vocational Behavior 2 (July 1972): 291-300. (ERIC No. EJ 061 632).

Maola, J., and Kane, G. "Comparison of Computer-Based Versus Counselor-Based Occupational Information Systems with Disadvantaged Vocational Students." Journal of Counseling Psychology 23 (March 1976): 163-165. (ERIC No. EJ 134 272).

Maslach, C. "The Burn-Out Syndrome and Patient Care." In Stress and Survival: The Emotional Realities of Life-Threatening Illness, edited by L. Garfield. St Louis, MO: C. V. Mosby, 1979.

Maze, M., and Cummings, R. How to Select a Computer-Assisted Career Guidance System. Richmond, CA: EUREKA, 1982. (ERIC Document Reproduction Service No. ED 221 700).

McKinlay, B., and Adams, D. Evaluation of the Occupational Information Access System as Used at Churchill High School. A Project Report. Eugene: University of Oregon, 1971. (ERIC Document Reproduction Service No. ED 084 435).

Meichenbaum, D. Cognitive-Behavior Modification. New York: Plenum Press, 1977.

Melhus, G.; Hershenson, D.; and Vermillion, M. "Computer-Assisted Versus Traditional Vocational Counseling with High and Low Readiness Clients." Journal of Vocational Behavior 3 (April 1973): 137-144.

Miller, A. L., and Tiedeman, D. V. "Decision-Making for the '70s: The Cubing of the Tiedeman Paradigm and Its Application in Career Education." Focus on Guidance 5 (September 1972): 1-15.

Miller, N. E., and Dollard, J. Social Learning and Imitation. New Haven, CT: Institute of Human Relations, Yale University Press, 1941.

Minor, F. J. Third Symposium for Systems under Development for Vocational Guidance. Yorktown Heights, NY: IBM, Advanced Systems Development Division, 1967.

Minor, F. J.; Myers, R. A.; and Super, D. E. "An Experimental Computer-Based Educational and Career Exploration System." Personnel and Guidance Journal 47 (February 1969): 564-569. (ERIC No. EJ 002 898).

Mitchell, A. M.; Jones, G. B.; and Krumboltz, J. D., eds. Social Learning Theory in Career Decision Making. Cranston, RI: Carroll Press, 1979.

Mitchell, T. R., and Beach, L. R. "A Review of Occupational Preference and Choice Research using Expectancy Theory and Decision Theory." Journal of Occupational Psychology 49 (1976): 231-248.

Pilato, G. T., and Myers, R. A. "The Effects of Computer-Mediated Vocational Guidance Procedures on the Appropriateness of Vocational Preference." Journal of Vocational Behavior 6 (February 1975): 61-72.

Pitz, G. F., and Harren, V. A. "An Analysis of Career Decision Making from the Point of View of Information Processing and Decision Theory." Journal of Vocational Behavior 16 (June 1980): 320-342. (ERIC No. EJ 223 201).

Price, G., and Johnson, R. "Computer-Assisted Course Selection." Journal of Counseling Psychology 20 (July 1973): 327-331.

Pyle, K., and Stripling, R. "The Counselor, the Computer, and Career Development." Vocational Guidance Quarterly 25 (September 1976): 71-75.

Raiffa, H. Decision Analysis: Introductory Lectures on Choices under Uncertainty. Reading, MA: Addison-Wesley, 1968.

Rest, J. R. "Developmental Psychology as a Guide to Value Education: A Review of 'Kohlbergian' Programs." Review of Education Research 44 (Spring 1974): 241-259.

Restle, F. Psychology of Judgment and Choice. New York: Wiley, 1961.

Richmond Unified School District. EUREKA, the California Career Information System. An Interim Report. Richmond, CA: Richmond Unified School District, 1977. (ERIC Document Reproduction Service No. ED 145 144).

Rokeach, M. The Nature of Human Values. New York: Free Press, 1973.

Rotter, J. B. Social Learning and Clinical Psychology. New York: Prentice-Hall, 1954.

Ryan, T. A., and Krumboltz, J. D. "Effect of Planned Reinforcement Counseling on Client Decision-Making Behavior." Journal of Counseling Psychology 11 (Winter 1964): 315-323, 333-335.

Sarnoff, D., and Remer, P. "The Effects of Guided Imagery on the Generation of Career Alternatives." Journal of Vocational Behavior 21 (December 1982): 299-308. (ERIC No. EJ 272 298).

Selman, R., and Kohlberg, L. "The Relation of Stages of Social Perspective-Taking to Moral Development: A Theoretical and Empirical Analysis." In Moralization: The Cognitive Developmental Approach, edited by L. Kohlberg and E. Turiel. New York: Holt, Rinehart and Winston, 1976.

Shatkin, L. Computer-Assisted Guidance: Descriptions of Systems. Princeton, NJ: Educational Testing Service, 1980.

Sheehy, G. Pathfinders. New York: Morrow, 1981.

Skovholt, T., and Hoenninger, R. "Guided Fantasy in Career Counseling." Personnel and Guidance Journal 52 (June 1974): 693-696.

Smith, M.; Hartley, J.; and Stewart, B. "A Case Study of Repertory Grids Used in Vocational Guidance." Journal of Occupational Psychology 51 (1978): 97-104.

Stilwell, W. E., and Thoresen, C. E. "Social Modeling and Vocational Behaviors of Mexican-American and Non-Mexican-American Adolescents." Vocational Guidance Quarterly 20 (June 1972): 279-286. (ERIC No. EJ 059 432).

Stone, G. L. A Cognitive-Behavioral Approach to Counseling Psychology. New York: Praeger, 1980.

Stone, G. L.; Jebson, P.; Walk, P.; and Belsham, R. "Identification of Stress and Coping Skills within a Critical Care Setting: Preliminary Findings and Musings." Paper presented at the annual meeting of the American Educational Research Association, New York, 1982.

Super, D. E. Computer-Assisted Counseling. New York: Teachers College Press, 1970.

Super, D. E. "Computers in Support of Vocational Development and Counseling." In Career Guidance for a New Age, edited by H. Borow. Boston: Houghton Mifflin, 1973.

Super, D. E. "Vocational Maturity Theory: Toward Implementing a Psychology of Careers in Career Education and Guidance." In Measuring Vocational Maturity for Counseling and Evaluation, edited by D. E. Super. Washington, DC: National Vocational Guidance Association, 1974.

Super, D. E. "A Life-span, Life-space Approach to Career Development." Journal of Vocational Behavior 16 (June 1980): 282-296. (ERIC No. EJ 223 198).

Super, D. E., and Hall, D. T. "Career Development: Exploration and Planning." In Annual Review of Psychology, vol. 29, edited by M. Rosenzweig and L. Porter. Palo Alto, CA: Annual Reviews, Inc., 1978.

Super, D. E., and Thompson, A. S. "A Six-Scale, Two-Factor Measure of Adolescent Career or Vocational Maturity." Vocational Guidance Quarterly 28 (September 1979): 6-15. (ERIC No. EJ 215 668).

Tarde, G. The Laws of Imitation. 2d ed. New York: Holt, 1903.

Thompson, A. P. "Client Misconceptions in Vocational Counseling." Personnel and Guidance Journal 55 (September 1976): 30-33. (ERIC No. EJ 146 123).

Thompson, A. S.; Lindeman, R. H.; Clack, S.; and Bohn, M. J., Jr. Educational and Career Exploration System: Field Trial and Evaluation in Montclair High School. New York: Teachers College, Columbia University, 1970. (ERIC Document Reproduction Service No. ED 046 005).

Thoresen, C. E.; Hosford, R. E.; and Krumboltz, J. D. "Determining Effective Models for Counseling Clients of Varying Competencies." Journal of Counseling Psychology 17 (July 1970): 369-375. (ERIC No. EJ 022 528).

Thoresen, C. E.; Krumboltz, J. D.; and Varenhorst, V. "Sex of Counselors and Models: Effect on Client Career Exploration." Journal of Counseling Psychology 14 (November 1967): 503-508.

Tiedeman, D. V. "Predicament, Problem, and Psychology: The Case for Paradox in Life and Counseling Psychology." Journal of Counseling Psychology 14 (January 1967): 1-8.

Tiedeman, D. V. Career Development: Designing Our Career Machines. Cranston, RI: Carroll Press, and Schenectady, NY: Character Research Press, 1979.

Tiedeman, D. V. "Flexible Filing, Computers, and Growing." Counseling Psychologist, forthcoming.

Tiedeman, D. V., and Miller-Tiedeman, A. L. "Choice and Decision Processes and Career Revisited." In Social Learning and Career Decision Making, edited by A. M. Mitchell, G. B. Jones, and J. D. Krumboltz. Cranston, RI: Carroll Press, 1979.

Tiedeman, D. V., and O'Hara, R. P. Career Development: Choice and Adjustment. New York: College Entrance Examination Board, 1963.

Warner, S. G., and Jepsen, D. A. "Differential Effects of Conceptual Level and Group Counseling Format on Adolescent Career Decision-Making Processes." Journal of Counseling Psychology 26 (November 1979): 497-503. (ERIC No. EJ 223 435).

Watts, A. G., and Ballantine, M. "Computers in Careers Guidance: The British Experience." Counseling Psychologist, forthcoming.

Weinrach, S. G. "A Rational-Emotive Approach to Occupational Mental Health." Vocational Guidance Quarterly 28 (March 1980): 208-217. (ERIC No. EJ 223 179).

Welch, T. A. Massachusetts Occupational Information System (MOIS). Annual Progress Report, December 31, 1976-December 31, 1977. Second Year of Operation. Wellesley Hills: Massachusetts Occupational Information System, 1978. (ERIC Document Reproduction Service No. ED 164 763).

Young, R. A. "The Effects of Value Confrontation and Reinforcement Counseling on the Career Planning Attitudes and Behavior of Adolescent Males." Journal of Vocational Behavior 15 (August 1979): 1-11. (ERIC No. EJ 204 389).

Zakay, D., and Barak, A. "Meaning and Career Decision-Making." Journal of Vocational Behavior, forthcoming.